MOBILE RADIO

MASTR® II MAINTENANCE MANUAL

25-50 MHz, 100-WATT TRANSMITTER (MOBILE)

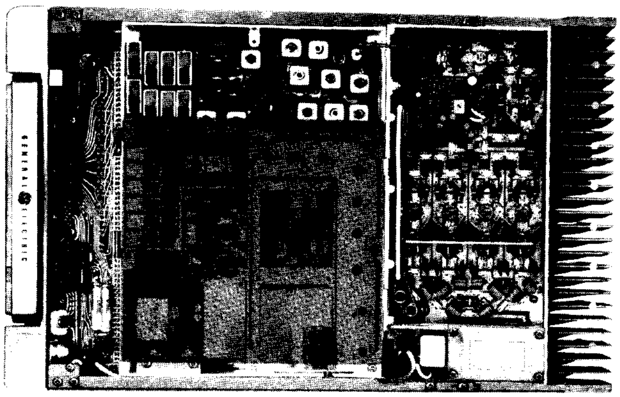
Maintenance Manual LBI4898E

DATAFILE FOLDER DF3155

(Supersedes LBI4600)

25-50 MHz EXCITER 19D416659G1-8

100-WATT PA ASSEMBLY 19C321295G5-8



SPECIFICATIONS *

Frequency Range	25-50 MHz	
Power Output	100 Watts (Adjustable from 50 to 100 Watts at 30 to 50 MHz, and from 75 to 100 Watts at 25 to 30 MHz)	
Crystal Multiplication Factor	3	
Frequency Stability		
5C-ICOM with EC-ICOM	±0.0005% (-40°C to +70°C)	
5C-ICOM or EC-ICOM	±0.0002% (0°C to +55°C)	
2C-ICOMS	±0.0002% (-40°C to +70°C)	
Spurious and Harmonic Emission	At least 85 dB below full rated power output	
Modulation	Adjustable from 0 to ±5 kHz swing with instantaneous modulation limiting.	
Modulation Sensitivity	80 to 120 Millivolts	
Audio Frequency Characteristics	Within +1 dB to -3 dB of a 6-dB/octave pre-emphasis from 300 to 3000 Hz per EIA standards. Post limiter filter per FCC and EIA.	
Distortion	Less than 2% (1000 Hz) Less than 3% (300 to 3000 Hz)	
Deviation Symmetry	0.5 kHz maximum	
Duty Cycle	EIA 20% Intermittent	
Maximum Frequency Spread: (2 to 8 channels)	Full Specifications	1 dB Degradation
25-30 MHz	.160 MHz	.320 MHz
30-36 MHz	.200 MHz	.400 MHz
36-42 MHz	.240 MHz	.470 MHz
42-50 MHz	.280 MHz	.540 MHz

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

Although the highest DC voltage in MASTR II Mobile Equipment is supplied by the vehicle battery, high currents may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits!

High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. KEEP AWAY FROM THESE CIRCUITS WHEN THE TRANSMITTER IS ENERGIZED!

DESCRIPTION

MASTR II transmitters are crystal-controlled phase modulated and designed for one- through eight-frequency operation in the 25 to 50 megahertz band. The solid state transmitter utilizes both integrated circuits (ICs) and discrete components, and consists of the following assemblies:

- Exciter Board; with audio, modulator, amplifier and multiplier stages.
- Power Amplifier Assembly; with amplifier, driver, PA, power control, filter and antenna switch.

CIRCUIT ANALYSIS

EXCITER

The exciter uses nine transistors and two integrated circuits to drive the PA assembly. The exciter can be equipped with up to eight Integrated Circuit Oscillator Modules (ICOMs). The ICOM crystal frequency ranges from approximately 8.33 to 16.67 megahertz, and the crystal frequency is multiplied three times (divided by four and multiplied by 12 for a multiplication factor of three).

Audio, supply voltages and control functions are connected from the system board to the exciter board through P902.

Centralized metering jack J103 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The test set meters the modulator, multiplier and amplifier stages.

ICOMS

Three different types of ICOMs are available for use in the exciter. Each of the ICOMs contains a crystal-controlled Colpitts oscillator, and two of the ICOMs contain compensator ICs. The different ICOMs are:

- 5C-ICOM - contains an oscillator and a 5 part-per-million (±0.0005%) compensator IC. Provides compensation for EC-ICOMs.
- EC-ICOM - contains an oscillator only. Requires external compensation from a 5C-ICOM.
- 2C-ICOM - contains an oscillator and a 2 PPM (±0.0002%) compensator IC. Will not provide compensation for an EC-ICOM.

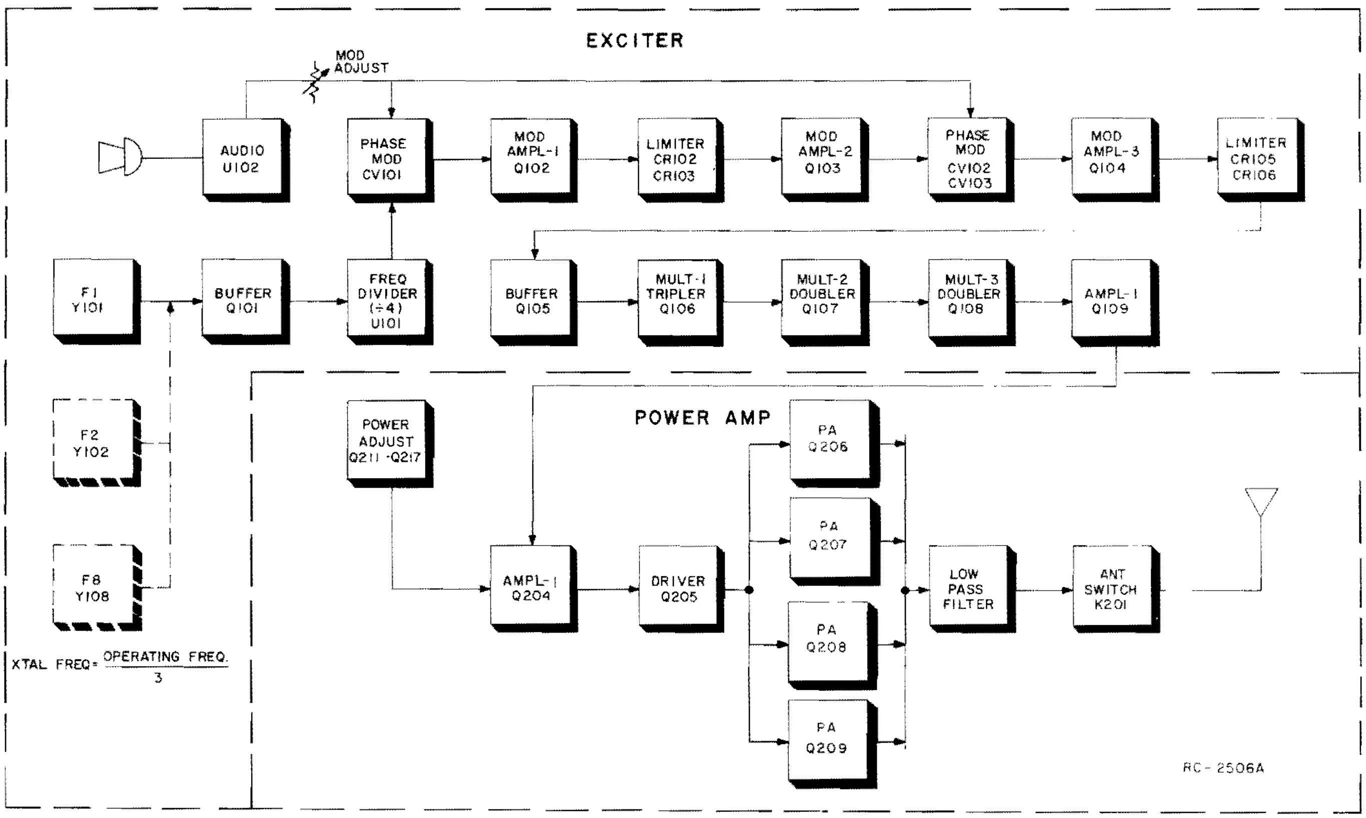


Figure 1 - Transmitter Block Diagram

The ICOMs are enclosed in an RF shielded can with the type ICOM (5C-ICOM, EC-ICOM or 2C-ICOM) printed on the top of the can. Access to the oscillator trimmer is obtained through a hole on the top of the can.

Frequency selection is accomplished by switching the ICOM keying lead (terminal 6) to A- by means of the frequency selector switch on the control unit. In single-frequency radios, a jumper from H9 to H10 in the control unit connects terminal 6 of the ICOM to A-. The oscillator is turned on by applying a keyed +10 Volts to the external oscillator load resistor. RF bypassing is provided for all unused keying loads in eight frequency radios. In two frequency radios the six unused keying leads are shorted to ground.

CAUTION

All ICOMs are individually compensated at the factory and cannot be repaired in the field. Any attempt to repair or change an ICOM frequency will void the warranty.

In standard 5 PPM radios using EC-ICOMs, at least one 5C-ICOM must be used. The 5C-ICOM is normally used in the receiver F1 position, but can be used in any transmit or receive position. One 5C-ICOM can provide compensation for up to 15 EC-ICOMs in the transmit and receiver. Should the 5C-ICOM compensator fail in the open mode, the EC-ICOMs will still maintain 2 PPM frequency stability from 0°C to 55°C (+32°F to 131°F) due to the regulated compensation voltage (5 Volts) from the 10-Volt regulator IC. If desired, up to 16 5C-ICOMs may be used in the radio.

The 2C-ICOMs are self-compensated at 2 PPM and will not provide compensation for EC-ICOMs.

Oscillator Circuit

The quartz crystals used in ICOMs exhibit the traditional "S" curve characteristics of output frequency versus operating temperature.

At both the coldest and hottest temperatures, the frequency increases with increasing temperature. In the middle temperature range (approximately 0°C to +55°C), frequency decreases with increasing temperature.

Since the rate of change is nearly linear over the mid-temperature range, the output frequency change can be compensated by choosing a parallel compensation capacitor with a temperature coefficient approximately equal and opposite that of the crystal.

Figure 2 shows the typical performance of an uncompensated crystal as well as the typical performance of a crystal which has been matched with a properly chosen compensation capacitor.

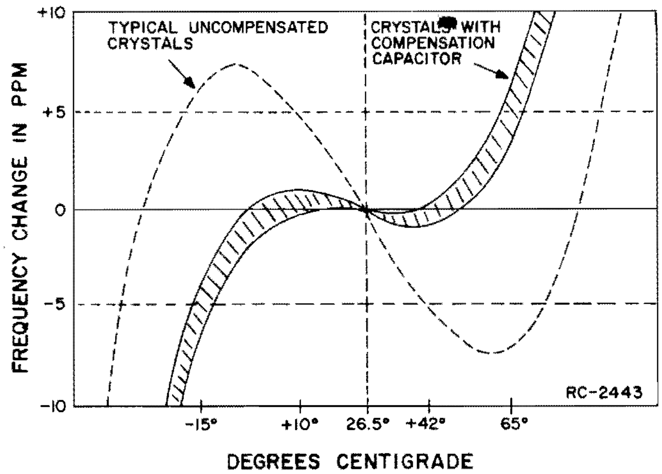


Figure 2 - Typical Crystal Characteristics

At temperatures above and below the mid-range, additional compensation must be introduced. An externally generated compensation voltage is applied to a varactor (voltage-variable capacitor) which is in parallel with the crystal.

A constant bias of 5 Volts (provided from Regulator IC U901 in parallel with the compensator) establishes the varactor capacity at a constant value over the entire mid-temperature range. With no additional compensation, all of the oscillators will provide 2 PPM frequency stability from 0°C to 55°C (+32°F to 131°F).

Compensator Circuits

Both the 5C-ICOMs and 2C-ICOMs are temperature compensated at both ends of the temperature range to provide instant frequency compensation. An equivalent ICOM circuit is shown in Figure 3.

The cold end compensation circuit does not operate at temperatures above 0°C. When the temperature drops below 0°C, the circuit is activated. As the temperature decreases, the equivalent resistance decreases and the compensation voltage increases.

The increase in compensation voltage decreases the capacity of the varactor in the oscillator, increasing the output frequency of the ICOM.

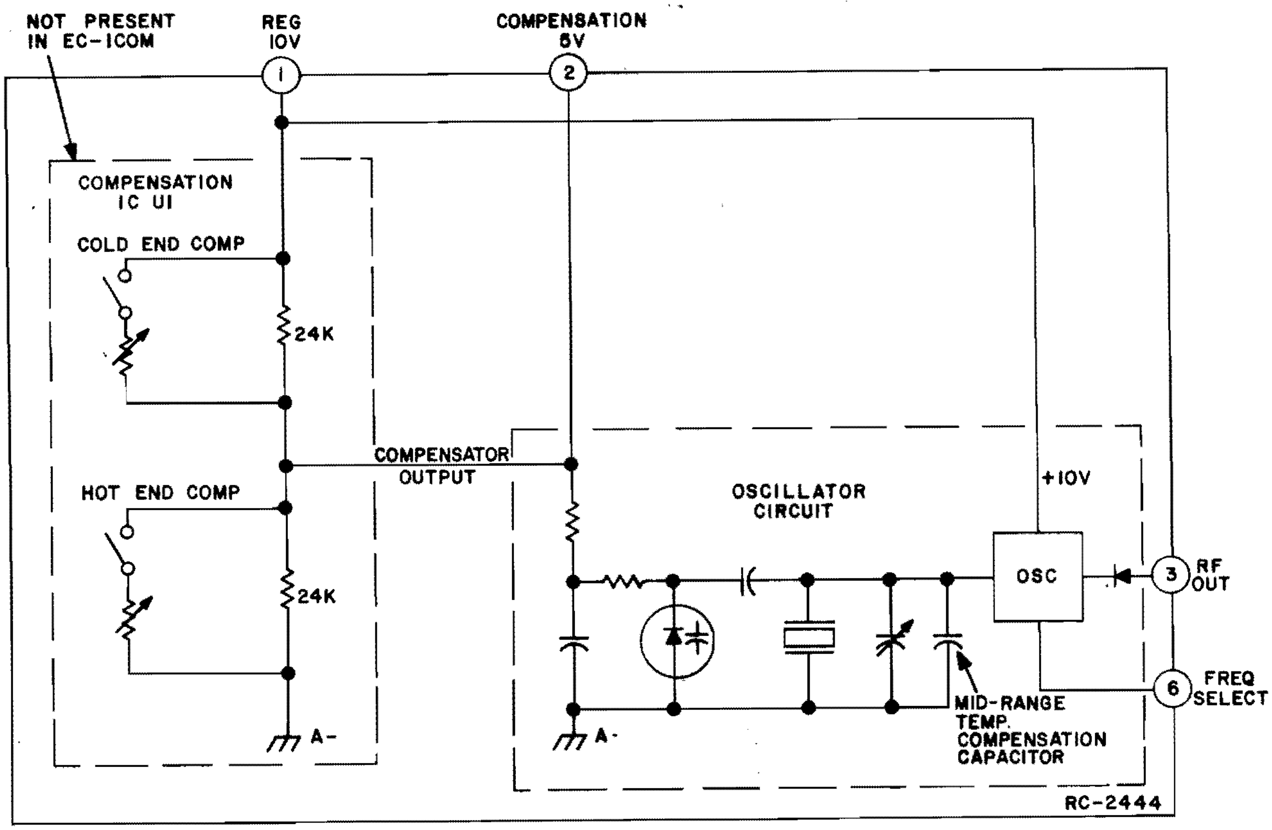


Figure 3 - Equivalent ICOM Circuit

The hot end compensation circuit does not operate at temperatures below +55°C. When the temperature rises above +55°C, the circuit is activated. As the temperature increases, the equivalent resistance decreases and the compensation voltage decreases. The decrease in compensation voltage increases the capacity of the varactor, decreasing the output frequency of the ICOM.

SERVICE NOTE: Proper ICOM operation is dependent on the closely-controlled input voltages from the 10-Volt regulator. Should all of the ICOMs shift off frequency, check the 10-Volt regulator module.

AUDIO IC

The transmitter audio circuitry is contained in audio IC U102. A simplified drawing of the audio IC is shown in Figure 4.

Audio from the microphone at pin 12 is coupled through pre-emphasis capacitor C1 to the base of Q1 in the operational amplifier-limiter circuit. Collector voltage for the transistorized microphone preamplifier is supplied from pin 11 through microphone collector load resistor R18 to pin 12.

The operational amplifier-limiter circuit consists of Q1, Q2 and Q3. Q3 provides limiting at high signal levels. The gain of the operational amplifier circuit is fixed by negative feedback through R19, R20 and the resistance in the network (pin 9).

The output of Q3 is coupled through a de-emphasis network (R10 and C3) to an active post-limiter filter consisting of C4, C5, C6, R11, R12, R13, R15, R17, and Q4.

Following the post-limiter filter is class A amplifier Q5. The output of Q5 is coupled through MOD ADJUST potentiometer R127 to the phase modulators.

SERVICE NOTE: If the DC voltages to the Audio IC are correct and no audio output can be obtained, replace U102.

For radios equipped with Channel Guard, tone from the encoder is applied to the phase modulators through CHANNEL GUARD MOD ADJUST potentiometer R128, and resistors R110, R121 and R124. Instructions for setting R128 are contained in the modulation adjustment section of the Transmitter Alignment Procedure.

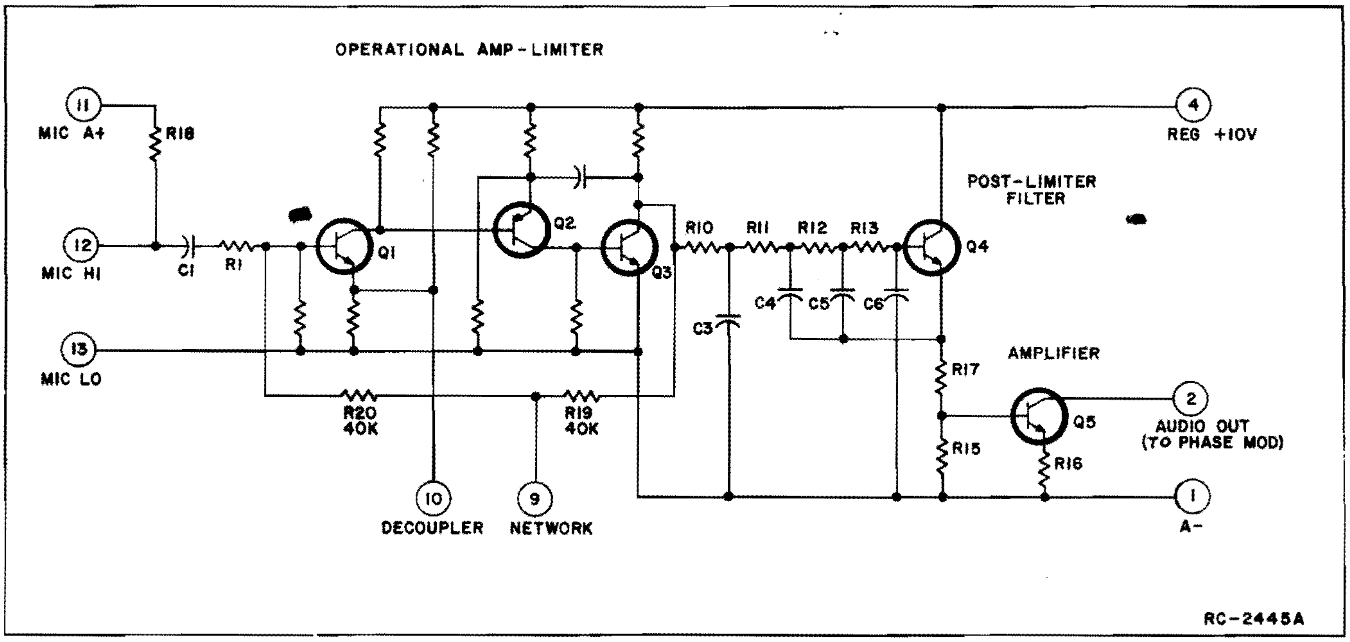


Figure 4 - Simplified Audio IC

FREQUENCY DIVIDER IC

The output at pin 3 of the selected ICOM is coupled through buffer amplifier Q101 to frequency divider U101, which divides the oscillator frequency by 4. The divider consists of two J-K flip-flops connected as a binary counter.

When the transmitter is not keyed (no ICOMs on), Q101 is saturated (turned on) with its collector voltage near zero. Keying the transmitter starts one of the ICOMs, and its output cuts Q101 on and off once each cycle. As Q101 turns off during each cycle, the drop in collector voltage causes the left flip-flop to change state. Assume the flip-flop was in the "0" state (the output at "Q" near A-). The first cycle of the oscillator output causes it to switch to the "1" stage (output at "Q" approximately 5 Volts). The second cycle will cause the flip-flop to switch back to the "0" state. Therefore, it requires two oscillator cycles to switch the left flip-flop through one complete cycle from "0" to "1" and back to "0".

When the left flip-flop switches from "1" to "0", it causes the right flip-flop to change state. It requires two cycles of the left flip-flop to switch the right flip-flop from "0" to "1" and back to "0". Therefore, four cycles of the oscillator output are required for each cycle of output from pin 9 of U101.

If U101 was operating into a pure resistive load, its output would be a square wave. However, the modulator circuit presents a tuned load to the IC, so that harmonics are filtered out and the waveform at the junction of C102 and C103 (modulator input) is essentially a sine wave at one-fourth the oscillator frequency. The output of the frequency divider is coupled through DC blocking capacitor C102 to the first modulator stage.

PHASE MODULATORS, AMPLIFIER & MULTIPLIERS

The first phase modulator is varactor (voltage-variable capacitor) CV101 in series with tunable coil L101. This network appears as a series-resonant circuit to the RF output of the oscillator. An audio signal applied to the modulator circuit through blocking capacitor C115 varies the bias of CV101, resulting in a phase modulated output. A voltage divider network (R108 and R109) provides the proper bias for varactors CV101, CV102 and CV103.

The output of the first modulator is coupled through blocking capacitor C106 to the base of Class A amplifier Q102. The first modulator stage is metered through a metering network consisting of R115, R150, C107 and CR101. Diodes CR102 and CR103 remove any amplitude modulation in the modulator output.

Following Q102 is another Class A Amplifier, Q103. The output of Q103 is applied to the second modulator stage. The second modulator consists of two cascaded modulator circuits consisting of CV102, L102, L103 and CV103. Following the second modulator is a Class A amplifier Q104. The output of the second modulator stage is metered through R133, R145, C117 and CR104, and is applied to the base of buffer Q105. Diodes CR105 and CR106 remove any amplitude modulation in the second modulator output.

Buffer Q105 is saturated when no RF signal is present. Applying an RF signal to Q105 provides a sawtooth waveform at its collector to drive the class C tripler, Q106. The tripler stage is metered through R146. The output of Q106 is coupled through tuned circuits T101, T102 and T103 to the base of doubler Q107. T101, T102 and T103 are tuned to one-fourth of the operating frequency. The doubler stage is metered through R147.

The output of Q107 is coupled through tuned circuits T104 and T105 to the base of second doubler Q108. T104 and T105 are tuned to one-half the operating frequency. Q108 is metered through R148.

The output of Q108 is coupled through three tuned circuits (T106, T107 and T108) to the base of amplifier Q109. The circuits are tuned to the transmitter operating frequency.

Q109 is a class C amplifier with a collector feed network consisting of C139, C141, L104, L108 and R143. The stage is metered through R149. The amplifier collector circuit consists of C142, C143, C146 and L105, and matches the amplifier output to the input of the power amplifier assembly.

POWER AMPLIFIER

The PA assembly uses six RF power transistors and seven transistors in the Power Control circuitry to provide a power output of 100 Watts. The broadband PA has no adjustments other than Power Control potentiometer R261.

Supply voltage for the PA is connected through power leads from the system board to feedthrough capacitors C297 and C298 on the bottom of the PA assembly. C297, C298 and C299, L297 and L298 prevent RF from getting on the Power leads. Diode CR295 will cause the main fuse in the fuse assembly to blow if the polarity of the power leads is reversed.

Centralized metering jack J205 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The Test Set meters the Ampl-1 drive (exciter output), Ampl-1 power control, Driver and PA current. L251 through L257 in conjunction with bypass capacitors C4210 through C4216 keep RF off of the metering leads.

RF AMPLIFIERS

The exciter output is coupled through an RF cable to PA input jack J201. RF from the exciter is coupled through DC blocking capacitor C201 to the base of Class C amplifier Q204 through a matching network. The network matches 50-ohm input to the base of Q204, and consists of C205, C206, C207, L201 and L202. R203 and R204 lower the gain of the amplifier stage.

Part of the RF input is rectified by CR201 and used to activate the Power Control circuit. Another portion of the rectified RF is applied to voltage dividers R201 and R202 for metering the Ampl-1 drive at J205.

Collector voltage to Q204 (Ampl-1) is controlled by the Power Control Circuit, and is applied through a collector stabilizing network consisting of L258 and R272 and collector feed network L205 and C213. The collector voltage of Q204 is metered through R271 at J205.

Following Q204 is a matching network (C208 through C212, L204 and L206) to a resistive pad (R207, R208 and R209). The output of the resistor network is applied to the base of the Class C driver (Q205) through a matching network consisting of C218, C219, C220, L207 and L208. Resistors R207 through R215 lower the gain of driver Q205.

Collector voltage to Q205 is coupled through a collector stabilizing network consisting of L259 and R273 and collector feed network L211 and C226. Collector current for Q205 is metered across tapped manganin resistor R249 at J205 (DRIVER CURRENT). The reading is taken on the one-Volt scale with the High Sensitivity button pressed, and read as 10 amperes full scale.

Following Q205 is a matching network (C221 through C225, L210 and L214) that matches the driver output to the input of the first power divider circuit (C230, C231, L214, L215 and L216).

The power amplifier stages consist of four identical paralleled Class C amplifiers (Q206 through Q209). The output of the first power divider circuit is applied to four additional power dividers. C234-L217 and C235-L218 provide drive for Q206 and Q207, while C236-L219 and C237-L220 provide drive for Q208 and Q209.

The output of C234-L217 is applied to the base of Q206 an impedance-matching network (L217, L221, C238, C242 and C243). Resistors R220 through R223, R236 and R237 lower the gain of Q206. Supply voltage for Q206 is coupled through a collector-stabilizing network consisting of L260 and R274 and collector feed network L223 and C270.

Collector current for Q206 through Q209 is metered across tapped maganin resistors R250 and R251 at J205 (PA CURRENT). The reading is taken on the one-Volt scale with the High Sensitivity button pressed, and read as 30 amperes full scale.

The output of Q206 is coupled through a matching network (C250, C251, L229, C258, C259, C266 and L237), applied to a lumped-constant combiner circuit (C280, L237 and L241), and added to the output of Q207. The outputs of Q206 and Q207 are added to the outputs of Q208 and Q209 through lumped-constant power combiner circuit C284, L249, C294, L250 and C285. The combined PA output is applied to 50-ohm microstrip W205, and then to an M-derived, constant K low-pass filter. The filter output is applied to the antenna through antenna switch K201.

Capacitors C286 through C293, C217, C228 and C233 provide ground isolation for ± ground operation.

WARNING

> The stud mounted RF Power Transistors used in the transmitter contain Beryllium Oxide, a TOXIC substance. If the ceramic, or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

POWER CONTROL CIRCUIT

When the transmitter is keyed, rectified RF from CR201 is applied to the base of switch Q211, turning it on. Turning on Q211 turns on voltage regulator Q212 which supplies a constant voltage to Power Adjust potentiometer R261.

Q215, Q216 and Q217 operate as an amplifier chain to supply voltage to the collector of Q204 (Ampl-1). The setting of R261 determines the voltage applied to the base of Q215. The higher the voltage at the base of Q215, the harder the amplifiers conduct, supplying more collector voltage to Q204. The lower the voltage at the base of Q215, the less collector voltage is supplied to Q204. Reducing the supply voltage to Q204 reduces the drive to Q205, thereby reducing the power output of the PA. The power output can be adjusted by R261 from approximately 50 to 100 Watts (75 to 100 Watts at 25-30 MHz).

Temperature protection is provided by Q213, Q214, and thermistor RT201 which is mounted in the PA heatsink. Under normal operating conditions, the circuit is inactive (Q213 is on and Q214 is off). When the heatsink temperature reaches approximately 100°C, the resistance of RT201 decreases. This increases the base voltage applied to Q213, turning it off. Turning off Q213 allows Q214 to turn on, decreasing the voltage at Power Adjust potentiometer R261. This reduces the base voltage to Q215 which causes Q216 and Q217 to conduct less, reducing the collector voltage to Q204 (Ampl-1). This reduces the transmitter output power, keeping the heatsink at a maximum of approximately 100°C. When the heatsink temperature decreases below 100°C, the temperature control circuit turns off, allowing the normal transmitter power output.

CARRIER CONTROL TIMER

The Carrier Control Timer option shuts off the transmitter on each transmission after a one-minute timing cycle, and alerts the operator that the transmitter is off by means of an alarm tone in the speaker. The transmitter can be turned on again by releasing and keying the push-to-talk switch on the microphone.

The timing cycle (transmitter keyed time) is normally set at the factory for a duration of one minute. A potentiometer permits the timing cycle to be adjusted from approximately 15 seconds to 3 minutes.

MAINTENANCE

DISASSEMBLY

To service the transmitter from the top:

1. Pull the locking handle down, then pry up the top cover at the front notch and lift off the cover.

To service the transmitter from the bottom:

1. Pull the locking handle down and pull the radio out of the mounting frame.
2. Remove the top cover, then loosen the two bottom cover retaining screws and remove the bottom cover (see Figure 5).
3. To gain access to the bottom of the exciter board, remove the six screws (A) holding the exciter board and its bottom cover to the module mounting frame, and remove the bottom cover.

To remove the exciter board from the radio:

1. Unplug the exciter/PA cable (B).
2. Remove the six screws (A) holding the exciter board and its bottom cover to the module mounting frame (see Figure 6).
3. Press straight down on the plug-in exciter from the top to avoid bending the pins when unplugging the board from the system board jack.

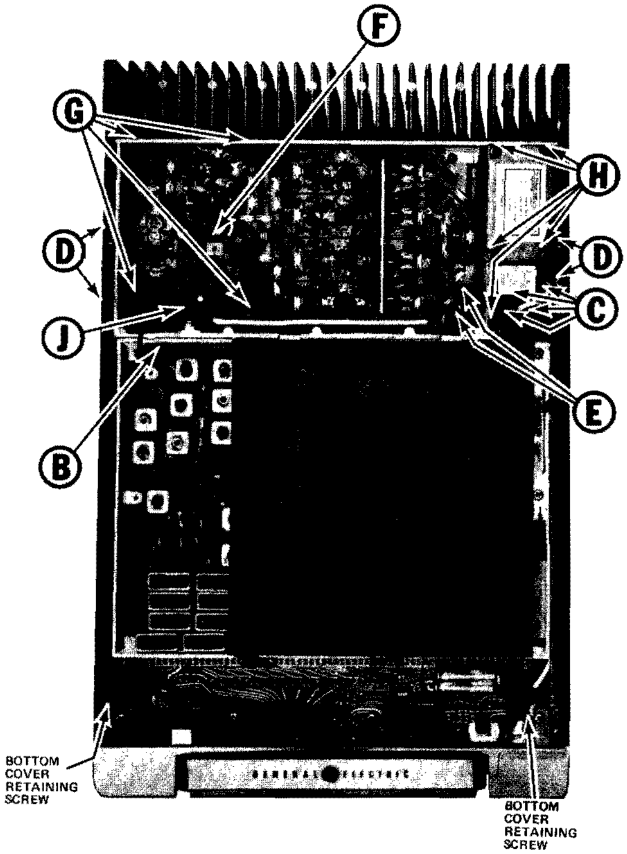


Figure 5 - Disassembly Procedure-Top View

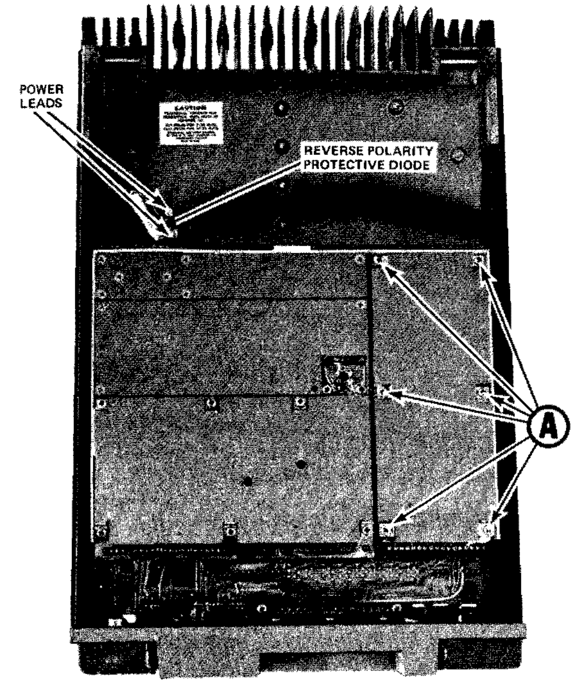


Figure 6 - Disassembly Procedure-Bottom View

To remove the PA assembly:

1. Remove the PA top cover and unplug the exciter/PA cable (B), the antenna, receiver and PTT cables (C).

2. Remove the four side-rail screws (D), and unsolder the power cables from the bottom of the PA assembly if desired.

To remove the PA board:

1. Remove the PA top cover and unplug the exciter/PA cable (B).

2. Unsolder the two feedthrough coils (E) and the thermistor leads (F).

3. Remove the PA transistor hold-down nuts and spring washers on the bottom of the PA assembly.

4. Remove the four PA board mounting screws (G), the five screws in the filter casting (H), and the retaining screw in Q210 (J), and lift the board out.

PA TRANSISTOR REPLACEMENT

WARNING

The stud mounted RF Power Transistors used in the transmitter contain Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

To replace the PA RF transistors:

1. Unsolder one lead at a time with a 50-Watt soldering iron. Use a scribe to hold the lead away from the printed circuit board until the solder cools.

2. Turn the transmitter over.

3. Hold the body of the transistor to prevent it from turning. Remove the transistor hold-down nut and spring washer through the hole in the heatsink with an 11/32-inch nut-driver. Lift out the transistor, and remove the old solder from the printed circuit board with a de-soldering tool such as a SOLDA PULLT®. Special care should be taken to prevent damage to the printed circuit board runs.

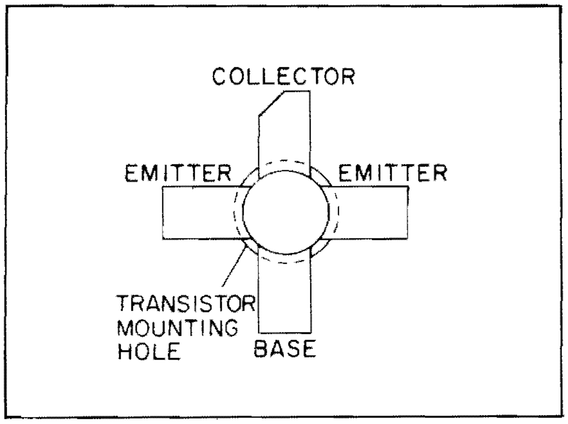


Figure 7 - Lead Identification

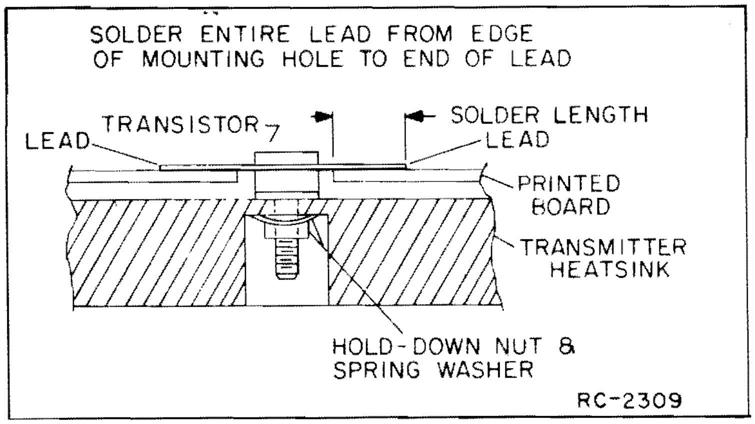


Figure 8 - Lead Forming

4. Trim the new transistor leads (if required) to the lead length of the removed transistor. Cut the collector lead at a 45° angle for future identification (see Figure 7). The letter "C" on the top of the transistor indicates the collector.

5. Apply a coating of silicon grease around the transistor mounting surface, and place the transistor in the mounting hole. Align the leads as shown in the Outline Diagram. Then hold the body of the transistor and replace the holding-down nut and spring-washer using moderate torque (8 inch-pounds). A torque wrench must be used for this adjustment since transistor damage can result if too little or too much torque is used.

6. Make sure that the transistor leads are formed as shown in Figure 8 so that the leads can be soldered to the printed circuit pattern, starting from the inner edge of the mounting hole.

7. Solder the leads to the printed circuit pattern. Start at the inner edge of mounting hole and solder the remaining length of transistor lead to the board. Use care not to use excessive heat that causes the printed wire board runs to lift up from the board. Check for shorts and solder bridges before applying power.

CAUTION

Failure to solder the transistor leads as directed may result in the generation of RF loops that could damage the transistor or may cause low power output.

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

MODULATION LEVEL ADJUSTMENT

The MOD ADJUST (R127) was adjusted to the proper setting before shipment and should not normally require readjustment. This setting permits approximately 75% modulation for the average voice level. The audio peaks which would cause overmodulation are clipped by the modulation limiter. The limiter, in conjunction with the de-emphasis network, instantaneously limits the slope of the audio wave to the modulator, thereby preventing overmodulation while preserving intelligibility.

TEST EQUIPMENT

1. An audio oscillator (GE Model 4EX6A10)
2. A frequency modulation monitor
3. An output meter or a VTVM
4. GE Test Set Models 4EX3A11 or 4EX8K12

PROCEDURE

1. Connect the audio oscillator and the meter across audio input terminals J10 (Green-Hi) and J11 (Black-Lo) on GE Test Set, or across P902-6 (Mike High) through a 0.5 microfarad (or larger) DC blocking capacitor, and P902-5 (Mike-Low) on the System Board.
2. Adjust the audio oscillator for 1-Volt RMS at 1000 Hz.
3. For transmitters without Channel Guard, set MOD ADJUST R127 for a 4.5-kilohertz swing with the deviation polarity which gives the highest reading as indicated on the frequency modulation monitor.
4. For transmitters with Channel Guard, set Channel Guard MOD ADJUST R128 for zero tone deviation. Next, with the 1-Volt signal at 1000 Hz applied, set MOD ADJUST R127 for a 3.75 kHz deviation. Then remove the signal from the audio oscillator and set Channel Guard MOD ADJUST R128 for 0.75 kHz tone deviation.
5. For multi-frequency transmitters, set the deviation as described in Steps 3 or 4 on the channel producing the largest amount of deviation.

PA POWER INPUT

For FCC purposes, the PA power input can be determined by measuring the PA supply voltage and PA current, and using the following formula:

$$P_i = \text{PA voltage} \times \text{PA current}$$

where:

P_i is the power input in Watts,

PA voltage is measured with Test Set Model 4EX3A11 in Position G on the 15-Volt range (read as 15 Volts full scale), and with the polarity switch in the (-) position. With Test Set Model 4EX8K12, use the B+ position and the 1-Volt range (read as 15 Volts full scale), with the HIGH SENSITIVITY button pressed and the polarity switch in the (-) position.

PA current is measured with the Test Set in Position G in the Test 1 position, and with the HIGH SENSITIVITY button pressed (30 amperes full scale).

Example:

P_i = 12.4 Volts x 8.5 amperes = 105.4 Watts

ICOM FREQUENCY ADJUSTMENT

First, check the frequency to determine if any adjustment is required. The frequency should be set with a frequency meter or counter with an absolute accuracy that is 5 to 10 times better than the tolerance to be maintained, and with the entire radio as near as possible to an ambient temperature of 26.5°C (79.8°F).

MASTR II ICOMs should be reset only when the frequency shows deviations in excess of the following limits:

A. ±0.5 PPM, when the radio is at 26.5°C (79.8°F).

B. ±2 PPM at any other temperature within the range of -5°C to +55°C (+23°F to +131°F).

C. The specification limit (±2 PPM or ±5 PPM) at any temperature within the ranges of -40°C to -5°C (-40°F to +23°F) or +55°C to +70°C (+131°F to +158°F).

If an adjustment is required, pry up the cover on the top of the ICOM to expose the trimmer, and use one of the following procedures:

If the radio is at an ambient temperature of 26.5°C (79.8°F), set the oscillator for the correct operating frequency.

If the radio is not at an ambient temperature of 26.5°C, setting errors can be minimized as follows:

A. To hold setting error to ±0.6 PPM (which is considered reasonable for 5 PPM ICOMS):

1. Maintain the radio at 26.5°C (±5°C) and set the oscillator to desired frequency, or-
2. Maintain the radio at 26.5°C (±10°C) and offset the oscillator, as a function of actual temperature, by the amount shown in Figure 9.

B. To hold setting error to ±0.35 PPM (which is considered reasonable for 2 PPM ICOMs): Maintain unit at 26.5°C (±5°C) and offset the oscillator, as a function of actual temperature, by the amount shown in Figure 9.

For example: Assume the ambient temperature of the radio is 18.5°C (65.4°F). At that temperature, the curve shows a correction factor of 0.3 PPM. (At 25 MHz, 1 PPM is 25 Hz. At 50 MHz, 1 PPM is 50 Hz).

With an operating frequency of 50 MHz, set the oscillator for a reading of 15 Hz (0.3 x 50 Hz) higher than the licensed operating frequency. If a negative correction factor is obtained (at temperatures above 26.5°C), set the oscillator for the indicated PPM lower than the licensed operating frequency.

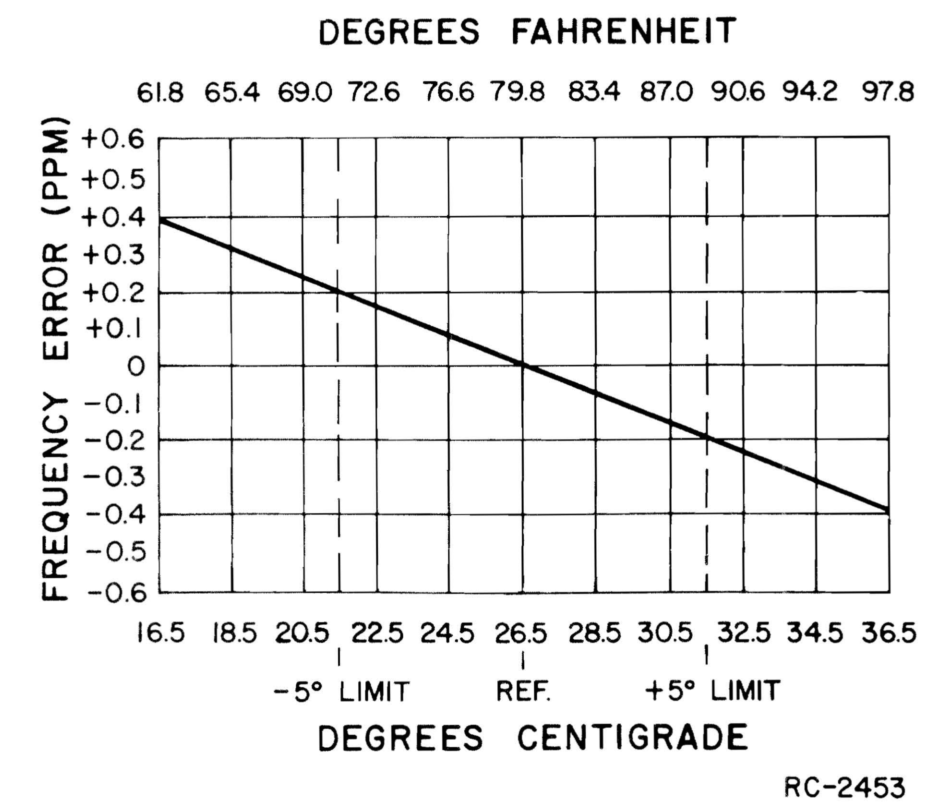
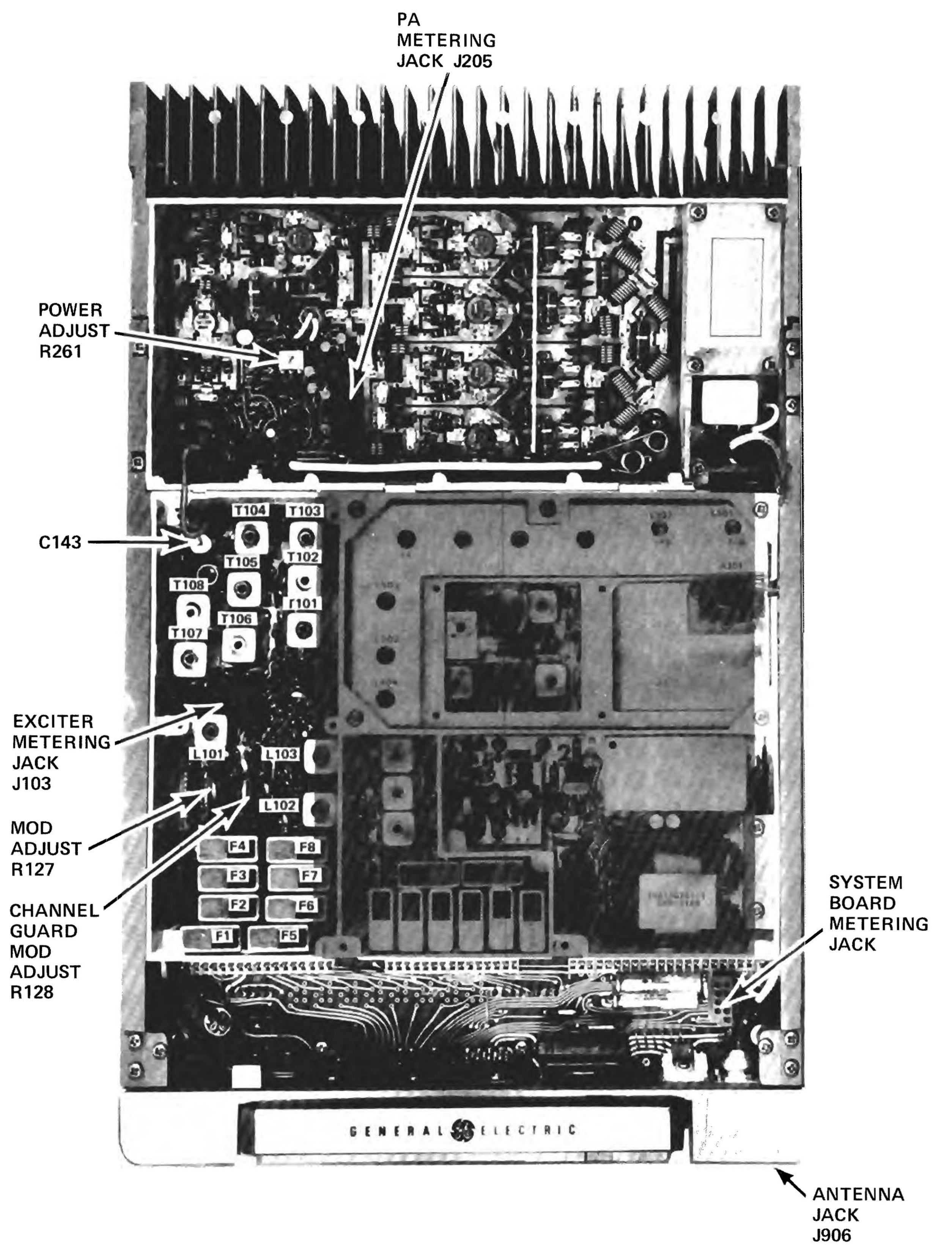


Figure 9 - Frequency Characteristics Vs. Temperature



TRANSMITTER ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A11 or Test Kit 4EX8K12.
2. A 50-ohm wattmeter connected to antenna jack J906.
3. A frequency counter.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Place ICOMs on Exciter Board (crystal frequency = operating frequency ÷ 3).
2. For a large change in frequency or a badly mis-aligned transmitter, pre-set the slugs in T101 through T108, and L101, L102 and L103 to the bottom of the coil form.

NOTE

The tuning frequency for multi-frequency transmitters is determined by the operating frequency and the frequency spread between transmitters. Refer to the table below for maximum frequency spread.

3. For multi-frequency transmitters with a frequency spread less than that specified in column (1), tune the transmitters to the lowest frequency.

For frequency spread exceeding the limits specified in column (1), tune the transmitters using a center frequency tune up ICOM. Except the maximum frequency spread can be extended to the limits specified in column (3) with 1 dB degradation.

For tuning L101, L102, L103. Always tune L101, L102, L103 on the lowest frequency.

Multi-frequency Transmitter Tuning

Transmitter Frequency Range	MAXIMUM FREQUENCY SPREAD		
	(1) without center tuning	with center tuning	with center tuning (1dB degradation)
25 - 30 MHz	.080 MHz	.160 MHz	.320 MHz
30 - 36 MHz	.100 MHz	.200 MHz	.400 MHz
36 - 42 MHz	.120 MHz	.240 MHz	.470 MHz
42 - 50 MHz	.140 MHz	.280 MHz	.540 MHz

4. Connect the red plug on the GE Test Set to the System Board metering jack, and the black plug to the Exciter metering jack. Set the polarity to +, and set the range to the Test 1 position (1-Volt position for 4EX8K12) for all adjustments. NOTE: With the Test Set connected to the PA metering jack, the voltage reading at position "F" with the HIGH SENSITIVITY button pressed may be converted to driver collector current by reading the current as 10 amperes full scale. The voltage reading at position "G" with the HIGH SENSITIVITY button pressed may be converted to PA collector current by reading the current as 30 amperes full scale.
5. All adjustments are made with the transmitter keyed. Unkey the transmitter between steps to avoid unnecessary heating.

STEP	METER POSITION	TUNING CONTROL	METER READING	PROCEDURE
1.	A MOD-1	L101	Maximum	Tune L101 for maximum meter reading.
2.	B	L102 & L103	Maximum	Tune L102 and then L103 for the maximum meter reading.
3.	C MULT-1	T101 & T102	See Procedure	Tune L101 for a dip in meter reading, and then tune T102 for maximum meter reading.
4.	D MULT-2	T103, T102, T101 & T104	See Procedure	Tune T103 for maximum meter reading and re-adjust T102 and T101 for maximum meter reading. Then tune T104 for a dip in meter reading.
5.	F MULT-3	T105, T104, T106 & T107	See Procedure	Tune T105 for maximum meter reading and re-adjust T104 for maximum meter reading. Then tune T106 for a dip in meter reading and T107 for maximum meter reading.
6.	G AMPL-1	T108, T107 & T106	See Procedure	Tune T108 for maximum meter reading, and then re-adjust T107 and T106 for maximum meter reading.
7.	D AMPL-1 DRIVE (on PA)	C143, C156	Maximum	Move the black metering plug to the Power Amplifier metering jack and tune C143 and C156 for maximum meter reading.
8.		R261		With the battery voltage at 13.4 Volts or the PA collector voltage at 12.4 Volts, set Power Adjust potentiometer R261 on the PA board for the desired power output (from 50 to 100 Watts at 30-50 MHz, or from 75 to 100 Watts at 25-30 MHz). If the battery voltage is not at 13.4 Volts or the collector voltage at 12.4 Volts and full rated output is desired (50 to 100 Watts at 30-50 MHz, or from 75 to 100 Watts at 25-30 MHz), set R261 for the output power according to the battery voltage or collector voltage shown in Figure 10. NOTE The PA collector voltage is measured as described in the PA POWER INPUT section.

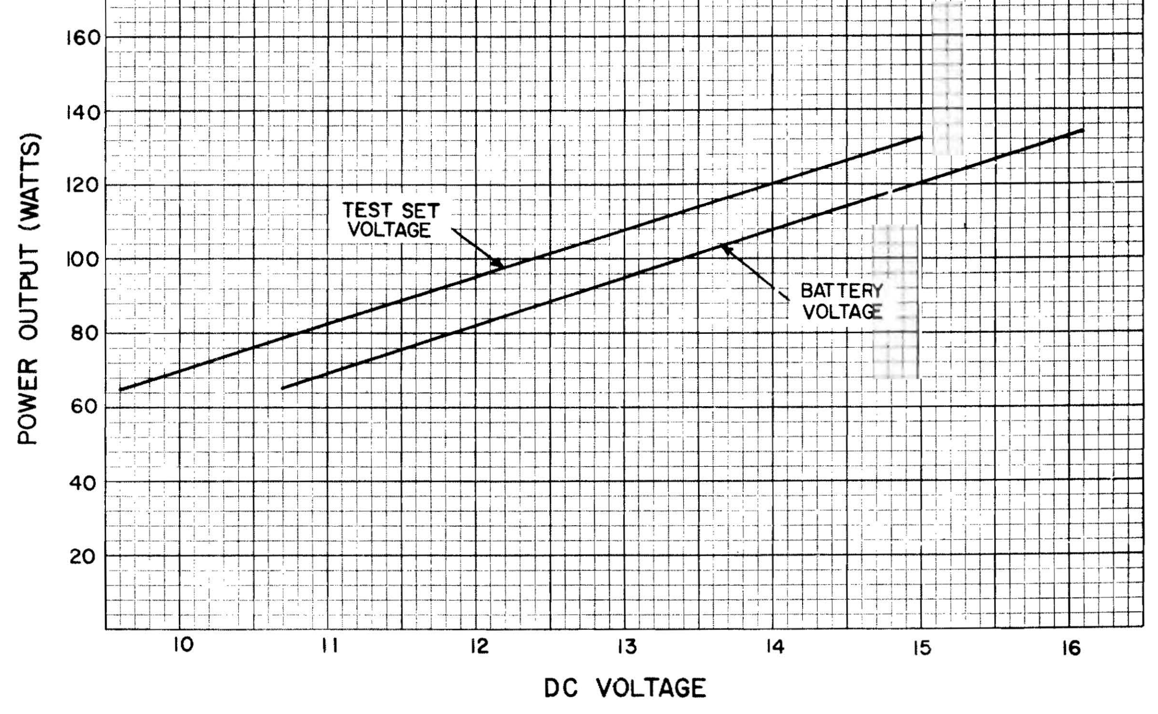


Figure 10 - Power Output Setting Chart

TEST PROCEDURES

These Test Procedures are designed to assist you in servicing a transmitter that is operating--but not properly. Problems encountered could be low power output, tone and voice deviation, defective audio sensitivity, and modulator adjust control set too high. Once a defect is pin-pointed, refer to the "Service Check" and the additional corrective measures included in the Transmitter Troubleshooting Procedure. Before starting with the Transmitter Test Procedures, be sure the transmitter is tuned and aligned to the proper operating frequency.

CAUTION

Before bench testing the MASTR II Mobile Radio, be sure of the output voltage characteristics of your bench power supply.

To protect the transmitter power output transistors from possible instant destruction, the following input voltages must not be exceeded:

Transmitter unkeyed: 20 Volts
Transmitter keyed (50 ohm resistive load): 18 Volts
Transmitter keyed (no load or non-resistive load): 15.5 Volts

These voltages are specified at the normal vehicle battery terminals of the radio and take the voltage drop of standard cables into account. The voltage limit shown for a non-optimum load is for "worst case" conditions. For antenna mismatches likely to be encountered in practice, the actual limit will approach the 18 Volt figure.

Routine transmitter tests should be performed at EIA Standard Test Voltages (13.6 VDC for loads of 6 to 16 amperes; 13.4 VDC for loads of 16 to 36 amperes). Input voltages must not exceed the limits shown, even for transient peaks of short duration.

Many commonly used bench power supplies cannot meet these requirements for load regulation and transient voltage suppression. Bench supplies which employ "brute force" regulation and filtering (such as Lapp Model 73) may be usable when operated in parallel with a 12-Volt automotive storage battery.

TEST EQUIPMENT REQUIRED

for test hookup as shown:

1. Wattmeter similar to:

   Bird # 43
   Jones # 711N

2. VTVM similar to:

   Triplett # 850
   Heath # IM-21

3. Audio Generator similar to:

   GE Model 4EX6A10

4. Deviation Meter (with a .75 kHz scale) similar to:
   Measurements # 720

5. Multimeter similar to:

   GE TEST SET MODEL 4EX3A11,
   MODEL 4EX8K12 or
   20,000 ohms-per-Volt voltmeter

POWER MEASUREMENT

TEST PROCEDURE

1. Connect transmitter output from the antenna jack to the wattmeter through a 50-ohm coaxial cable. Make sure the wattmeter is terminated into a 50-ohm load.

2. Key the transmitter and check the wattmeter for the desired power output.

SERVICE CHECK

Check the setting of the Power Adjust Control (R261).

Refer to the QUICK CHECKS on the Transmitter Troubleshooting Procedure.

VOICE DEVIATION, SYMMETRY AND AUDIO SENSITIVITY

TEST PROCEDURE

1. Connect the test equipment to the transmitter as shown.

2. In radios with Channel Guard, set Channel Guard Mod Adjust R128 for zero tone deviation.

3. Set the Audio generator output to 1.0 VOLTS RMS and frequency to 1 kHz.

4. Key the transmitter and adjust Deviation Meter to carrier frequency.

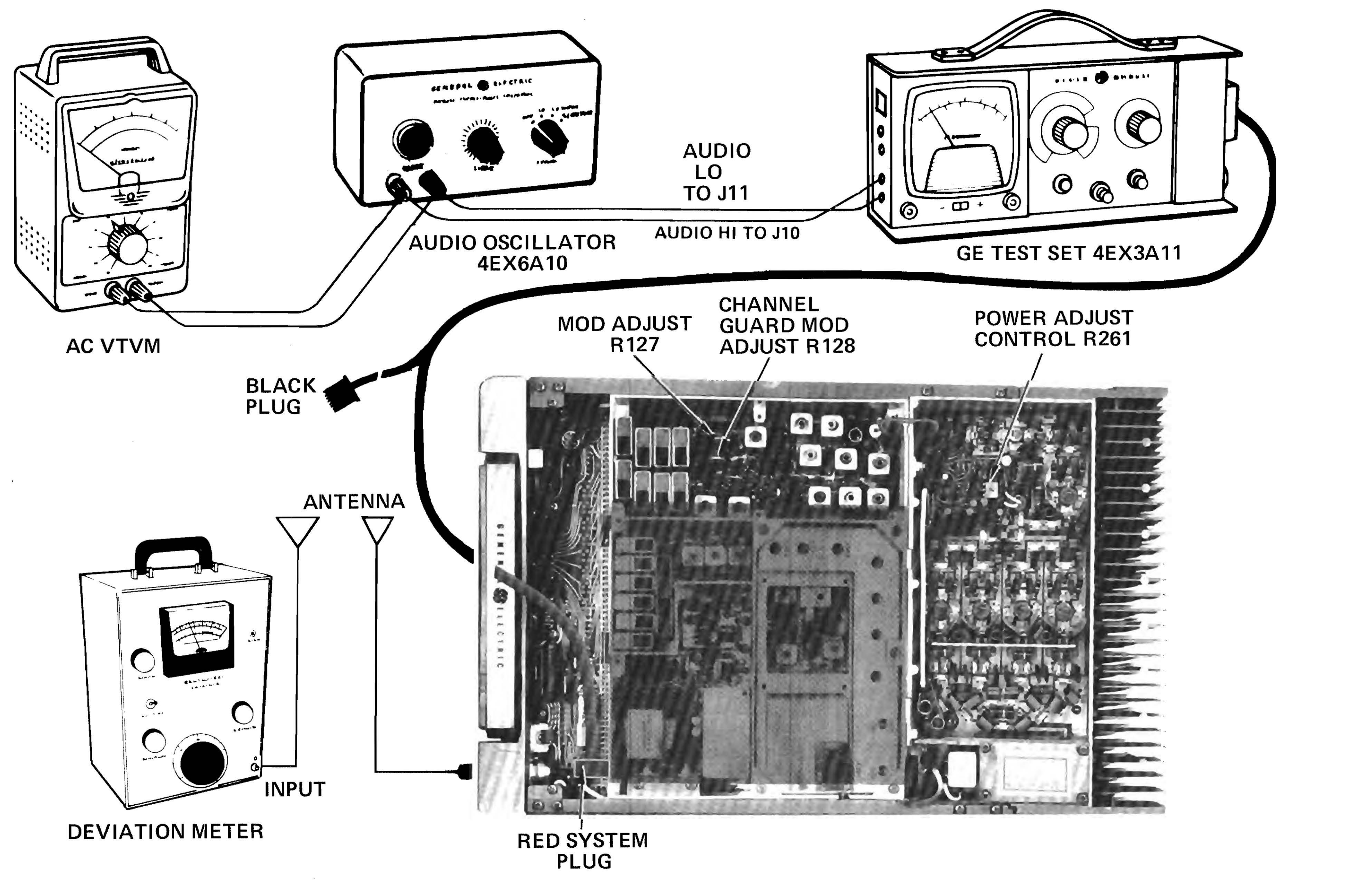
5. Deviation reading should be ±4.5 kHz in radios without Channel Guard, and ±3.75 kHz in radios with Channel Guard.

6. If necessary, adjust MOD ADJUST control R127 for the proper deviation on plus (+) or minus (-) deviation, whichever is greater.

NOTES:-- MASTR II transmitters are adjusted for 4.5 kHz deviation at the factory. The factory adjustment will prevent the transmitter from deviating more than 5.0 kHz under the worst conditions of frequency, voltage and temperature.

7. If the deviation reading plus (+) or minus (-) differs by more than 0.5 kHz, recheck Steps 1 and 2 as shown in the Transmitter Alignment Chart.

8. Check Audio Sensitivity by reducing generator output until deviation falls to 3.0 kHz for radios without Channel Guard, or 2.25 kHz for radios with Channel Guard. Voltage should be LESS than 120 millivolts. If not, refer to the Transmitter Troubleshooting Procedure.



TONE DEVIATION WITH CHANNEL GUARD

TEST PROCEDURE

1. Set up the Deviation Meter and monitor the output of the transmitter.

2. Remove the 1000 Hz signal from the audio generator.

3. Key the transmitter and check for 0.75 kHz deviation. If the reading is low or high, adjust Channel Guard MOD ADJUST R128 for a reading of 0.75 kHz.

NOTES:

1. On units supplied with Channel Guard, the Phase Modulator Tuning should be adjusted carefully to insure proper performance. (Refer to Steps 1 and 2 in the Transmitter Alignment Chart).

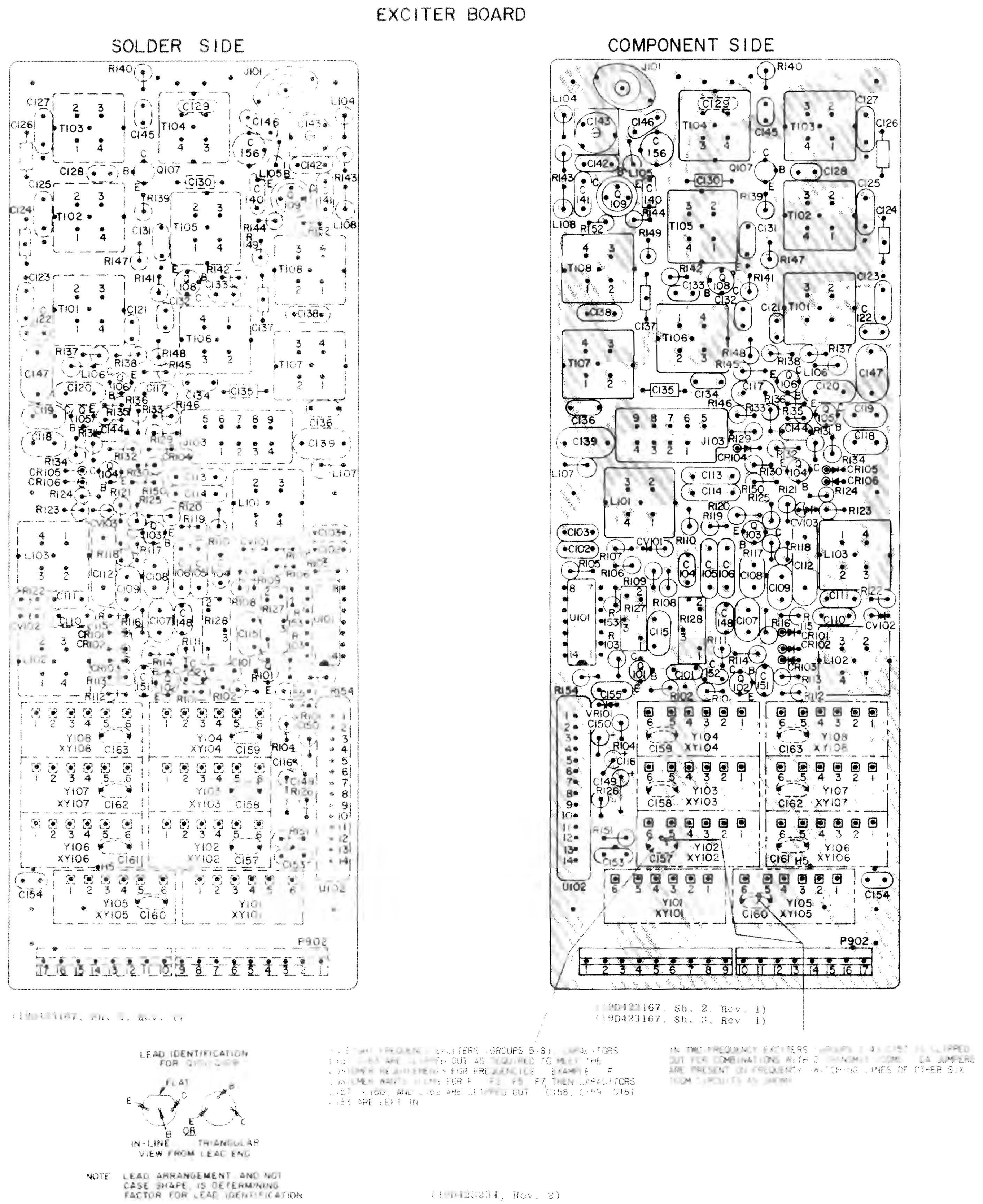
2. The Tone Deviation Test Procedures should be repeated every time the Tone Frequency is changed.

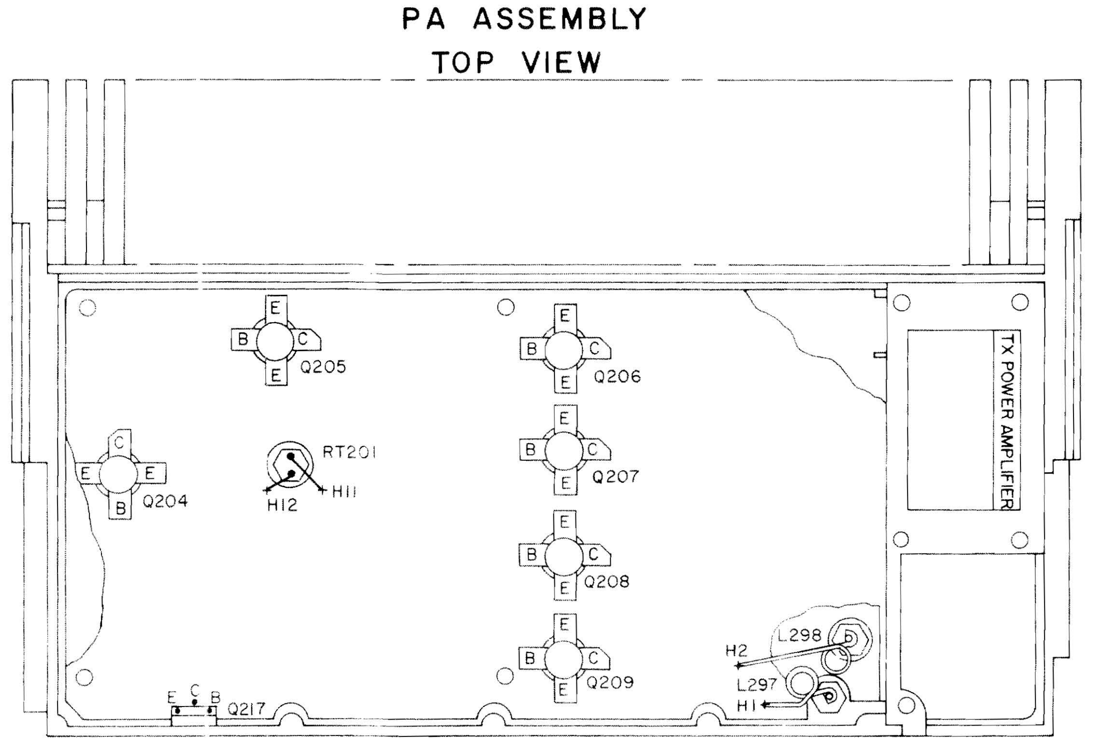
STEP I - QUICK CHECKS

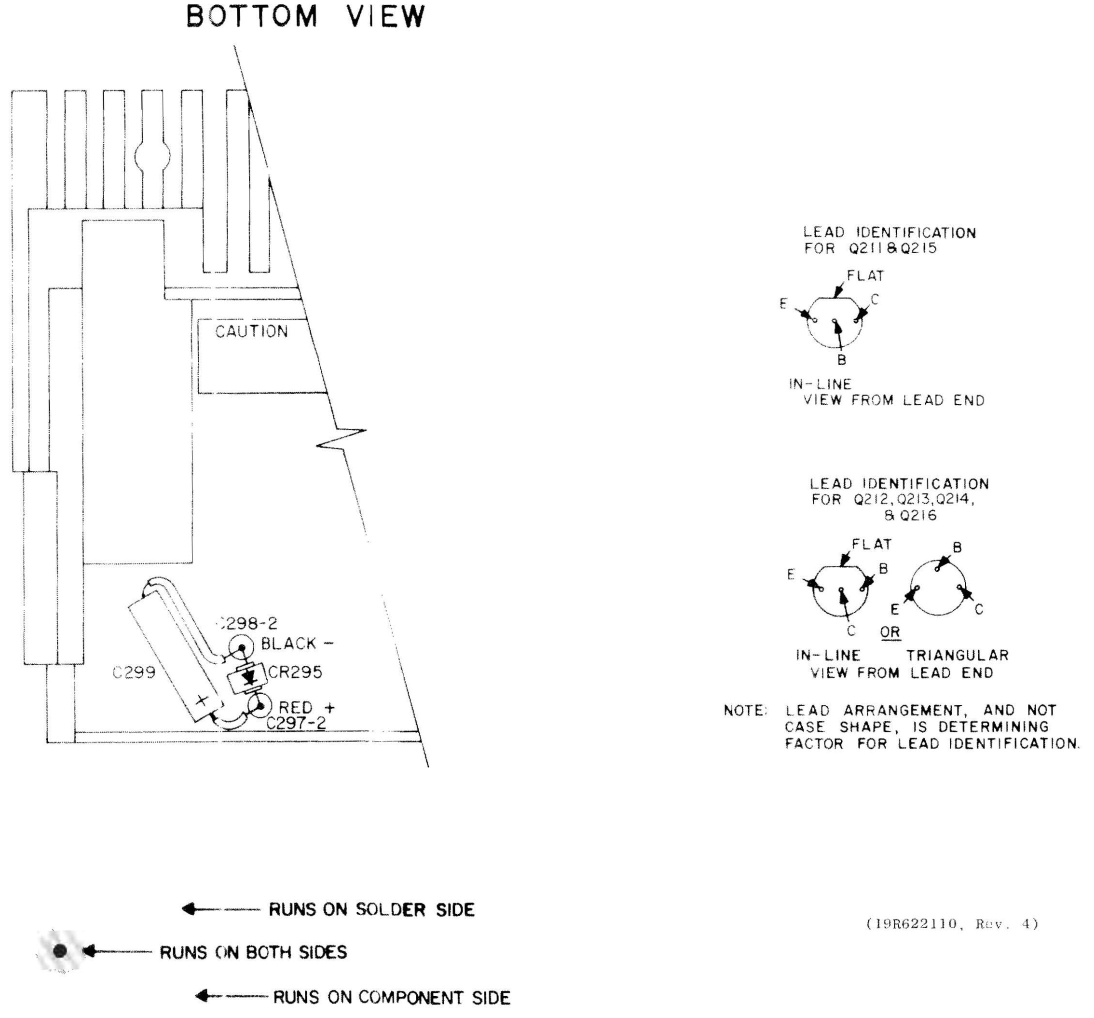
METER POSITION GE TEST SET	PROBABLE DEFECTIVE STAGE		
	HIGH METER READING	LOW METER READING	ZERO METER READING
EXCITER			
A (MOD-1)	Q102, 10-Volt regulator	Q102, CV101, L101, 10-Volt regulator	ICOM, Q101, U101, L101, Q102, CR101, 10-Volt regulator or Channel Selector switch ground.
B (MOD-2)	Q104, 10-Volt regulator	Q103, L102, L103, CV102, CV103, Q104	Q103, L102, CV102, L103, CV103, CR104, Q104
C (MULT-1)	Q105, Q106 T101	Q105, Q106	Q105, Q106, T101
D (MULT-2)	Q107, T104	T101, T102, T103, Q107	T101, T102, T103, Q107, T104
F (MULT-3)	Q108, T106	T104, T105, Q108	T104, T105, Q108, T106
G (AMPL-1)	Q109, C146, R144	T106, T107, T108, Q109, L108	T106, T107, T108, Q109, L104, L107
POWER AMPLIFIER			
"D" (AMPL-1 DRIVE)		Low Output from Exciter	No output from Exciter, CR201
"C" (AMPL-1 CONTROL VOLTAGE)	Q217	Q217	No Exciter output, Q217, Q211, CR201
"F" (DRIVER CURRENT)	Q205	Q205, Low Output from Q204	Q205, Q204, Check Pos. D & C
"G" (PA CURRENT)	Q206, Q207 Q208, Q209	Q204, Q205, Q206—Q209	Q204, Q205, Q206—Q209 ANTENNA SWITCH K201

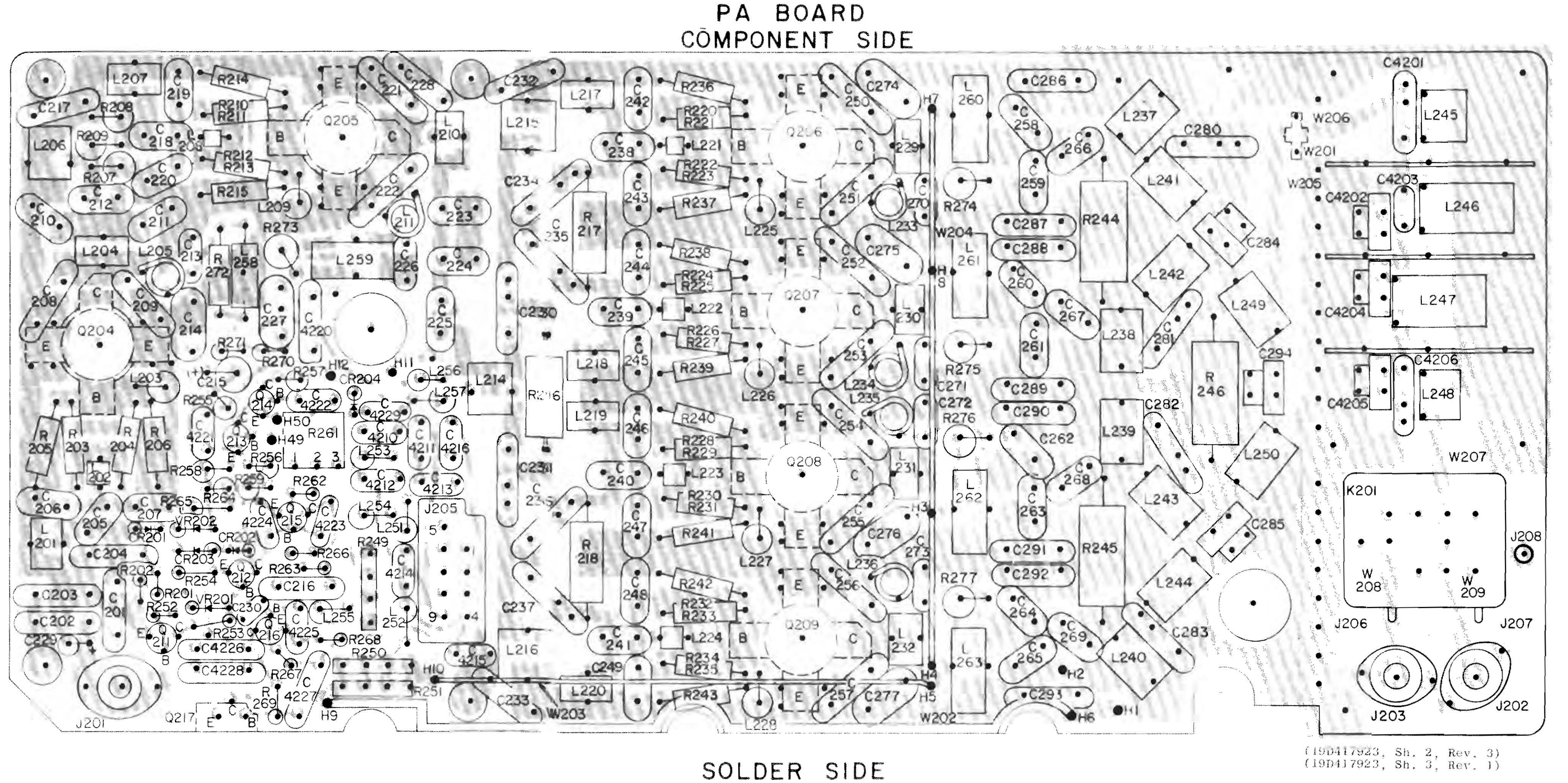
TROUBLESHOOTING PROCEDURE

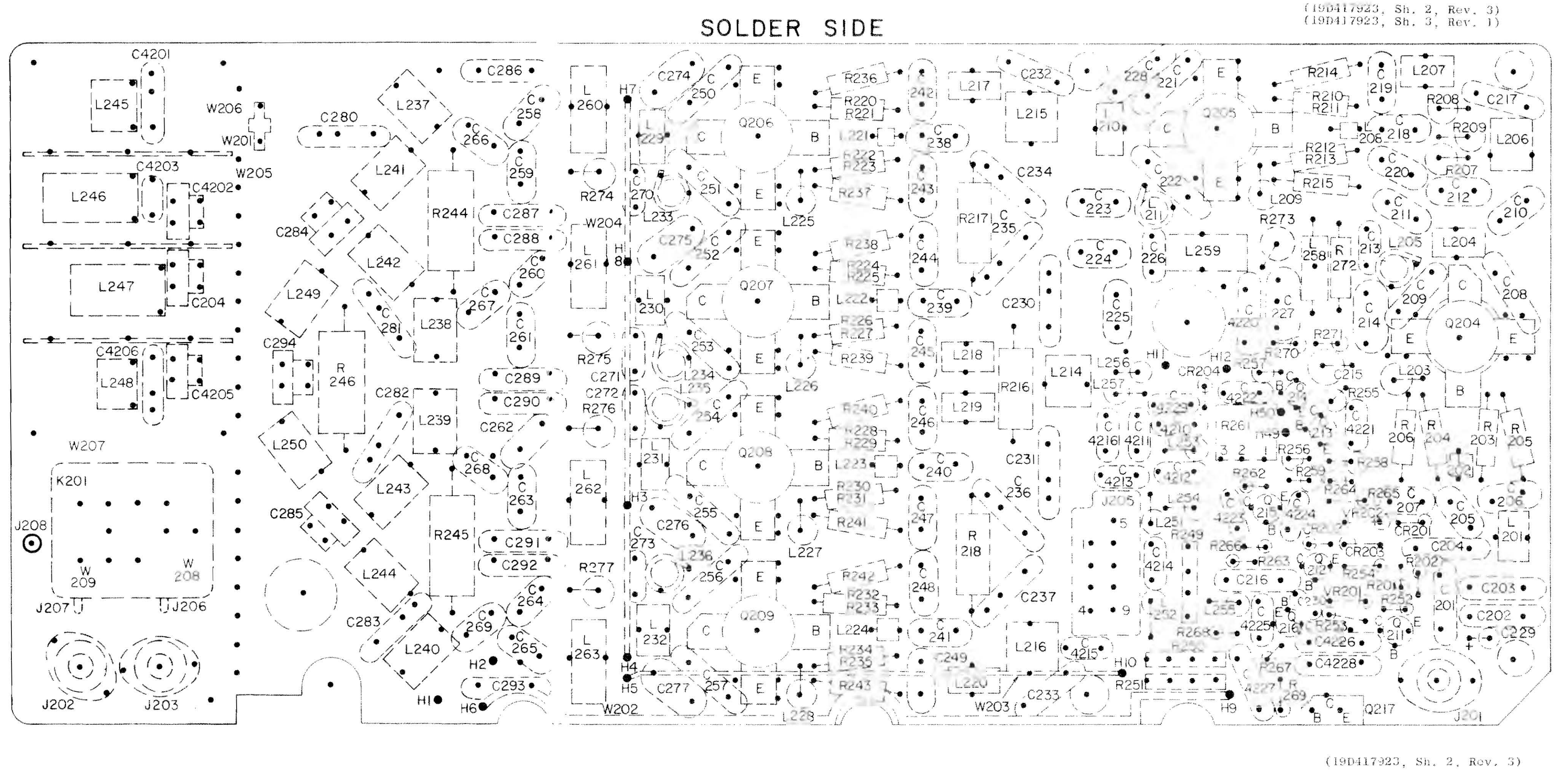
25—50 MHz, 100-WATT TRANSMITTER











OUTLINE DIAGRAM

25—50 MHz, 100-WATT TRANSMITTER

PARTS LIST

LBI4440G

25-50 MHz EXCITER
19D416659G1-G8

SYMBOL	GE PART NO.	DESCRIPTION
		19D416659G1 2 FREQ 25-30 MHz (LL) 19D416659G2 2 FREQ 30-36 MHz (L) 19D416659G3 2 FREQ 36-42 MHz (M) 19D416659G4 2 FREQ 42-50 MHz (H) 19D416659G5 8 FREQ 25-30 MHz (LL) 19D416659G6 8 FREQ 30-36 MHz (L) 19D416659G7 8 FREQ 36-42 MHz (M) 19D416659G8 8 FREQ 42-50 MHz (H)
		- - - - - - - - - - CAPACITORS - - - - - - - -
C101	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C102	19A116655P13	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C103	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C104	5494481P105	Ceramic disc: 330 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C105 and C106	19A116655P21	Ceramic disc: 2700 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C107 thru C109	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C110 and C111	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C112LL	4029003P104	Silver mica: 680 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-20.
C112L	4029003P104	Silver mica: 680 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-20.
C112M	5493367P1000K	Mica: 1000 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-20.
C112H	5493367P1000K	Mica: 1000 pf ±10%, 100 VDCW; sim to Electro Motive Type DM-20.
C113 and C114	19A116655P21	Ceramic disc: 2700 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C115	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C116	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C117 thru C119	19116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C120	5490008P139	Mica: 330 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C121 and C122	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C123LL	5496219P262	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -80 PPM.
C123L	5496219P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
C123M	5496219P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C123H	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C124LL	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
C124L	5491601P120	Phenolic: 1.0 pf ±5%, 500 VDCW.
C124M	5491601P120	Phenolic: 1.0 pf ±5%, 500 VDCW.
C124H	5491601P119	Phenolic: 0.82 pf ±5%, 500 VDCW.
C125LL	5496219P262	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -80 PPM.
C125L	5496219P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
C125M	5496219P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C125H	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C126LL	5491601P124	Phenolic: 1.8 pf ±5%, 500 VDCW.
C126L	5491601P124	Phenolic: 1.8 pf ±5%, 500 VDCW.
C126M	5491601P122	Phenolic: 1.2 pf ±5%, 500 VDCW.
C126H	5491601P122	Phenolic: 1.2 pf ±5%, 500 VDCW.
C127LL	5496219P262	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -80 PPM.
C127L	5496219P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
C127M	5496219P257	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -80 PPM.
C127H	5496219P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C128	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C129LL*	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV F.
C129L*	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV F.
C129M*	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV F.
C129H*	5496219P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM. Deleted by REV F.
C130LL	5491601P113	Phenolic: 0.47 pf ±5%, 500 VDCW.
C130L	5491601P110	Phenolic: 0.36 pf ±5%, 500 VDCW.
C130M*	5491601P109	Phenolic: 0.33 pf ±5%, 500 VDCW.
		In REV F & earlier:
	5491601P107	Phenolic: 0.27 pf ±5%, 500 VDCW.
C130H*	5491601P107	Phenolic: 0.27 pf ±5%, 500 VDCW.
		In REV F and earlier:
	5491601P105	Phenolic: 0.22 pf ±5%, 500 VDCW.
C131LL	5496219P255	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef -80 PPM.
C131L	5496219P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C131M	5496219P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C131H	5496219P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C132 and C133	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C134LL	5496219P243	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM.
C134L	5496219P240	Ceramic disc: 9.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C134M	5496219P242	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -80 PPM.
C134H	5496219P238	Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C135LL	5491601P117	Phenolic: 0.68 pf ±5%, 500 VDCW.
C135L	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C135M	5491601P115	Phenolic: 0.56 pf ±5%, 500 VDCW.
C135H	5491601P113	Phenolic: 0.47 pf ±5%, 500 VDCW.
C136LL	5496219P243	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM.
C136L	5496219P240	Ceramic disc: 9.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C136M	5496219P242	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -80 PPM.
C136H	5496219P238	Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C137LL	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C137L	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C137M	5491601P111	Phenolic: 0.39 pf ±5%, 500 VDCW.
C137H	5491601P111	Phenolic: 0.39 pf ±5%, 500 VDCW.
C138LL	5496219P243	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM.
C138L	5496219P240	Ceramic disc: 9.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C138M	5496219P242	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -80 PPM.
C138H	5496219P238	Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW.
C139	19A116080P107	Polyester: 0.1 µf ±20%, 50 VDCW.
C140	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C141LL	5490008P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C141L	5490008P125	Silver mica: 82 pf ±10%, 500 VDCW; sim to Electro Motive type DM-15.
C141M	5490008P123	Silver mica: 68 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C141H	5490008P127	Silver mica: 100 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C142LL	5490008P27	Silver mica: 100 pf ±50%, 50 VDCW; sim to Electro Motive Type DM-15.
C142L	5490008P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive type DM-15.
C142M	5490008P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C142H	5490008P24	Silver mica: 75 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C143	19A116163P5	Variable: approx 5 to 60 pf, 50 VDCW; sim to Amperex 2222-809-08003.
C144	5494481P105	Ceramic disc: 330 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C145	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C146*	5496219P238	Ceramic disc: 7.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM. Added by REV B.
C146LL*	19A116656P12J8	Ceramic: 12 pf, ±5%, 0 PPM. Deleted by REV B.
C146L*	19A116656P12J8	Ceramic: 12 pf, ±5%, 0 PPM. Deleted by REV B.
C146M*	19A116656P13J8	Ceramic: 13 pf, ±5%, 0 PPM. Deleted by REV B.
C146H*	19A116656P12J8	Ceramic: 12 pf, ±5%, 0 PPM. Deleted by REV B.
C147	19A116080P107	Polyester: 0.1 µf ±20%, 50 VDCW.
C148	5494481P105	Ceramic disc: 330 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C149	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C150	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C151	5494481P105	Ceramic disc: 330 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C152 thru C155	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C156*	19A116867P1	Variable, ceramic: 2.5-6 pf, +50% -10%, 160 VDCW; sim to 7-S-TRIKO-02. Added by REV B.
C157* thru C163*	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW. Added by REV C.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR101 thru CR106	19A115250P1	Silicon.
CV101 thru CV103	5495769P12	Silicon, capacitive.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J101	19A130924G1	Connector, receptacles; sim to Cinch 14H11613.
J103	19B219374G1	Connector. Includes:
	19A116651P1	Contact, electrical: sim to Malco XO-2864.
		- - - - - - - - - - TRANSFORMERS - - - - - - - -
L101LL	19D416635G9	Coil.
L101L	19D416635G17	Coil.
L101M	19D416635G1	Coil.
L101H	19D416635G18	Coil.
L102LL	19D416635G9	Coil.
L102L	19D416635G17	Coil.
L102M	19D416635G1	Coil.
L102H	19D416635G18	Coil.
L103LL	19D416635G9	Coil.
L103L	19D416635G17	Coil.
L103M	19D416635G1	Coil.
L103H	19D416635G18	Coil.
L104LL	7488079P9	Choke, RF: 2.70 µh ±10%, 1.20 ohms DC res max; sim to Jeffers 4411-13K.
L104L	7488079P8	Choke, RF: 2.20 µh ±10%, 1.00 ohms DC res max; sim to Jeffers 4411-12K.
L104M	7488079P7	Choke, RF: 1.50 µh ±10%, 0.50 ohms DC res max; sim to Jeffers 4411-10K.
L104H	7488079P7	Choke, RF: 1.50 µh ±10%, 0.50 ohms DC res max; sim to Jeffers 4411-10K.
L105LL	7488079P6	Choke, RF: 1.00 µh ±10%, 0.30 ohms DC res max; sim to Jeffers 4411-8K.
L105L	7488079P5	Choke, RF: 0.68 µh ±10%, 0.15 ohms DC res max; sim to Jeffers 4411-5K.
L105M	7488079P4	Choke, RF: 0.47 µh ±10%, 0.09 ohms DC res max; sim to Jeffers 4411-4K.
L105H	7488079P3	Choke, RF: 0.33 µh ±10%, 0.07 ohms DC res max; sim to Jeffers 4411-3K.
L106 and L107	7488079P16	Choke, RF: 10.0 µh ±10%, 0.60 ohms DC res max; sim to Jeffers 4421-7K.
L108	7488079P50	Choke, RF: 39.0 µh ±10%, 2.00 ohms DC res max; sim to Jeffers 4422-11K.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P902		Includes:
	19B219594P2	Contact strip: 8 pins.
	19B219594P3	Contact strip: 9 pins.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q101*	19A115330P1	Silicon, NPN.
		In REV C and earlier:
	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q102 thru Q106	19A115330P1	Silicon, NPN.
Q107*	19A115328P1	Silicon, NPN.
		Earlier than REV A:
	19A115330P1	Silicon, NPN.
Q108	19A115328P1	Silicon, NPN.
Q109	19A115329P2	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R101	3R77P561K	Composition: 560 ohms ±10%, 1/2 w.
R102*	3R152P682J	Composition: 6.8K ohms ±5%, 1/4 w.
		In REV C and earlier:
	3R77P393K	Composition: 39K ohms ±10%, 1/2 w.
R103	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R104	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
R105	3R77P221K	Composition: 220 ohms ±10%, 1/2 w.
R106	3R77P102K	Composition: 1K ohms ±10%, 1/2 w.
R107	3R77P153K	Composition: 15K ohms ±10%, 1/2 w.
R108	3R77P474K	Composition: 470K ohms ±10%, 1/2 w.
R109	3R77P104K	Composition: 100K ohms ±10%, 1/2 w.
R110	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R111	3R77P750J	Composition: 75 ohms ±5%, 1/2 w.
R112	3R77P681K	Composition: 680 ohms ±10%, 1/2 w.
R113	3R77P332K	Composition: 3.3K ohms ±10%, 1/2 w.
R114	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R115	3R77P473K	Composition: 47K ohms ±10%, 1/2 w.
R116	3R77P561K	Composition: 560 ohms ±10%, 1/2 w.
R117	3R77P821K	Composition: 820 ohms ±10%, 1/2 w.
R118	3R77P222K	Composition: 2.2K ohms ±10%, 1/2 w.
R119	3R77P681K	Composition: 680 ohms ±10%, 1/2 w.
R120	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R121	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R122 and R123	3R77P153K	Composition: 15K ohms ±10%, 1/2 w.
R124	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R125	3R77P102K	Composition: 1K ohms ±10%, 1/2 w.
R126*	3R77P431J	Composition: 430 ohms ±5%, 1/2 w.
		In REV D and earlier:
	3R77P391K	Composition: 390 ohms ±10%, 1/2 w.
R127	19B209358P106	Variable, carbon film: approx 300 to 10K ohms ±10%, 0.25 w; sim to CTS Type X-201.
R128	19B209358P108	Variable, carbon film: approx 2K to 50K ohms ±10%, 0.25 w; sim to CTS Type X-201.
R129	3R77P750J	Composition: 75 ohms ±5%, 1/2 w.
R130	3R77P681K	Composition: 680 ohms ±10%, 1/2 w.
R131	3R77P332K	Composition: 3.3K ohms ±10%, 1/2 w.
R132	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R133	3R77P473K	Composition: 47K ohms ±10%, 1/2 w.
R134	3R77P561K	Composition: 560 ohms ±10%, 1/2 w.
R135	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R136	3R77P102K	Composition: 1K ohms ±10%, 1/2 w.
R137	3R77P330K	Composition: 33 ohms ±10%, 1/2 w.
R138	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R139	3R77P121K	Composition: 120 ohms ±10%, 1/2 w.
R140	3R77P220K	Composition: 22 ohms ±10%, 1/2 w.
R141	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
R142	3R77P220K	Composition: 22 ohms ±10%, 1/2 w.
R143LL	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R143L	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R143M	3R77P820K	Composition: 82 ohms ±10%, 1/2 w.
R143H	3R77P820K	Composition: 82 ohms ±10%, 1/2 w.
R144LL	3R77P150K	Composition: 15 ohms ±10%, 1/2 w.
R144L	3R77P150K	Composition: 15 ohms ±10%, 1/2 w.
R144M	3R77P100K	Composition: 10 ohms ±10%, 1/2 w.
R144H	3R77P100K	Composition: 10 ohms ±10%, 1/2 w.
R145	3R77P333K	Composition: 33K ohms ±10%, 1/2 w.
R146	3R77P683K	Composition: 68K ohms ±10%, 1/2 w.
R147 thru R150	3R77P333K	Composition: 33K ohms ±10%, 1/2 w.
R151	3R77P102K	Composition: 1K ohms ±10%, 1/2 w.
R152	3R77P100K	Composition: 10 ohms ±10%, 1/2 w.
R153 and R154	3R77P102K	Composition: 1K ohms ±10%, 1/2 w.
		- - - - - - - - - - TRANSFORMER - - - - - - - -
T101LL	19D416635G10	Coil. Includes:
	5493185P13	Tuning slug.
T101L	19D416635G10	Coil. Includes:
	5493185P13	Tuning slug.
T101M	19D416635G2	Coil. Includes:
	5493185P13	Tuning slug.
T101H	19D416635G2	Coil. Includes:
	5493185P13	Tuning slug.
T102LL	19D416635G11	Coil. Includes:
	5493185P13	Tuning slug.
T102L	19D416635G11	Coil. Includes:
	5493185P13	Tuning slug.
T102M	19D416635G3	Coil. Includes:
	5493185P13	Tuning slug.
T102H	19D416635G3	Coil. Includes:
	5493185P13	Tuning slug.
T103LL	19D416635G12	Coil. Includes:
	5493185P13	Tuning slug.
T103L	19D416635G12	Coil. Includes:
	5493185P13	Tuning slug.
T103M	19D416635G4	Coil. Includes:
	5493185P13	Tuning slug.
T103H	19D416635G4	Coil. Includes:
	5493185P13	Tuning slug.
T104LL*	19D416635G19	Coil.
		In REV E and earlier:
	19D416635G13	Coil. Includes:
	5493185P13	Tuning slug.
T104L*	19D416635G20	Coil.
		In REV E and earlier:
	19D416635G13	Coil. Includes:
	5493185P13	Tuning slug.
T104M*	19D416635G21	Coil.
		In REV E and earlier:
	19D416635G5	Coil. Includes:
	5493185P13	Tuning slug.
T104H*	19D416635G22	Coil.
		In REV E and earlier:
	19D416635G5	Coil. Includes:
	5493185P13	Tuning slug.
T105LL	19D416635G13	Coil. Includes:
	5493185P13	Tuning slug.
T105L	19D416635G13	Coil. Includes:
	5493185P13	Tuning slug.
T105M	19D416635G5	Coil. Includes:
	5493185P13	Tuning slug.
T105H	19D416635G5	Coil. Includes:
	5493185P13	Tuning slug.
T106LL	19D416635G14	Coil. Includes:
	5493185P13	Tuning slug.
T106L	19D416635G14	Coil. Includes:
	5493185P13	Tuning slug.
T106M	19D416635G6	Coil. Includes:
	5493185P13	Tuning slug.
T106H	19D416635G6	Coil. Includes:
	5493185P13	Tuning slug.
T107LL	19D416635G15	Coil. Includes:
	5493185P13	Tuning slug.
T107L	19D416635G15	Coil. Includes:
	5493185P13	Tuning slug.
T107M	19D416635G7	Coil. Includes:
	5493185P13	Tuning slug.
T107H	19D416635G7	Coil. Includes:
	5493185P13	Tuning slug.
T108LL	19D416635G16	Coil. Includes:
	5493185P13	Tuning slug.
T108L	19D416635G16	Coil. Includes:
	5493185P13	Tuning slug.
T108M	19D416635G8	Coil. Includes:
	5493185P13	Tuning slug.
T108H	19D416635G8	Coil. Includes:
	5493185P13	Tuning slug.
		- - - - - - - INTEGRATED CIRCUITS - - - - - - -
U101	19A116842P1	Frequency Divider: sim to Texas Instrument Type SN54H73N.
U102	19D416542G2	Transmitter, Audio.
		- - - - - - - VOLTAGE REGULATORS - - - - - - -
VR101	4036887P56	Silicon, Zener.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
		NOTE: When reordering, specify quantity.
XY101 thru XY108	19A116779P1	Contact, electrical; sim to Molex 08-54-0404.
		- - - - - - - - - - - OSCILLATORS - - - - - - - -
		NOTE: When reordering specify ICOM Frequency. ICOM Freq = (Operating Freq) / 3
Y101 thru Y108	19A129393G13	Compensated: 2 PPM, 25-50 MHz.
Y101 thru Y108	19A129393G16	Externally Compensated: 5 PPM, 25-50 MHz.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A121252P1	Heat sink. (Used with Q109).
	19A129424G2	Can. (Used with T101-T108 and L101-L103).
	4036555P1	Insulator, washer: nylon. (Used with Q109).
	4029006P3	Clip, compression: 0.375 x 0.19 x .02 inches, sim to Tinnerman Products Inc. C5426-014-24. (Used with Q109).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for description of parts affected by these revisions.

REV. A - D: - Exciter Board 19D416659G1-8.
Incorporated in initial shipment

REV. E - To increase audio sensitivity. Changed R126.

REV. F - To eliminate possible shorting of shield to wire runs on printed wire board. Changed T104LL, T104L, T104M and T104H. Deleted shield (19B219619P1), C129LL, C129L, C129M and C129H.

Exciter Board 19D416659G4&8

REV. G - To improve multi-frequency spread performance in cold temperatures. Changed C130H.

REV. G - Exciter Board 19D416659G3, 7
To improve operation. Changed C130.

DF-3155

■ NOTES:

1. IN TWO-FREQUENCY EXCITERS (GROUPS 1-4) C157 IS CLIPPED OUT FOR COMBINATIONS WITH 2 TRANSMIT ICOMS. DA JUMPERS ARE PRESENT ON FREQUENCY SWITCHING LINES OF OTHER SIX ICOM CIRCUITS.

2. IN EIGHT-FREQUENCY EXCITERS (GROUPS 5-8), CAPACITORS C157-C163 ARE CLIPPED OUT AS REQUIRED TO MEET THE CUSTOMER REQUIREMENTS FOR FREQUENCIES. EXAMPLE; IF CUSTOMER WANTS ICOMS FOR F1, F2, F5, F7, THEN CAPACITORS C157, C160, AND C162 ARE CLIPPED OUT. C158, C159, C161, C163 ARE LEFT IN.

✳ COMPONENT VALUES AS FOLLOWS:

COMPONENT IDENTIFICATION	LL 25-30 MHZ	L 30-36 MHZ	M 36-42 MHZ	H 42-50 MHZ
C112	680	680	1000	1000
C123	91	62	56	43
C124	1.5	1.0	1.0	0.82
C125	91	62	56	43
C126	1.8	1.8	1.2	1.2
C127	91	62	56	43
C129	47	33	22	15
C130	0.47	0.36	0.33	0.27
C131	47	33	22	15
C134	13	9	12	7
C135	0.68	0.51	0.56	0.47
C136	13	9	12	7
C137	0.51	0.51	0.39	0.39
C138	13	9	12	7
C141	100	82	68	100
C142	100	82	82	75
L104	2.7	2.2	1.5	1.5
L105	1.0	0.68	0.47	0.33
R143	100	100	82	82
R144	15	15	10	10

▲ THESE COMPONENTS NOT PRESENT ON 2ND EXCITER IN WIDE SPACE XMTR COMBINATIONS.

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED, AND MEASURED WITH A 20,000 OHMS-PER-VOLT METER WITH REFERENCE TO A- AND NOT CHASSIS GROUND.

AN RF CHOKE (25-50 MICROHENRYS) IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

EXCITER BOARD	REV LETTER	FREQ RANGE	NO. FREQ
19D416659G1	F	25-30	2
19D416659G2	F	30-36	2
19D416659G3	G	36-42	2
19D416659G4	G	42-50	2
19D416659G5	F	25-30	8
19D416659G6	F	30-36	8
19D416659G7	G	36-42	8
19D416659G8	G	42-50	8

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

(19R621827, Rev. 16)

SCHEMATIC DIAGRAM

25—50 MHz, EXCITER BOARD 19D416659G1-G8

 Issue 4

PA. ASM.	REV LTR	HEAT SINK ASM.	REV LTR	CPNT. BD. ASM.	REV LTR	FREQ.
STD PKG 19C321295G5		19B219688G6		19D417927G1	B	25-30 MHZ
STD PKG 19C321295G6				19D417927G2	A	30-36 MHZ
STD PKG 19C321295G7				19D417927G3	A	36-42 MHZ
STD PKG 19C321295G8				19D417927G4	A	42-50 MHZ
19C321295G13		19B219688G18		19D417927G1	B	25-30 MHZ
19C321295G14				19D417927G2	A	30-36 MHZ
19C321295G15				19D417927G3	A	36-42 MHZ
19C321295G16				19D417927G4	A	42-50 MHZ

▲COMPONENT VALUES

SYMBOL	LL 25-30 MHZ	L 30-36 MHZ	M 36-42 MHZ	H 42-50 MHZ
C205	270	220	180	180
C206	150	150	150	220
C207	120	120	150	180
C208	330	300	200	180
C209	330	300	200	180
C210	220	180	150	150
C211	180	180	120	100
C212	220	150	120	120
C213	1000	1000	680	680
C218	330	220	180	180
C219	470	470	470	390
C220	470	390	390	390
C221	160	130	110	91
C222	160	130	110	91
C223	180	270	270	180
C224	390	220	120	180
C225	180	150	120	120
C226	1000	1000	680	680
C230	82	68	56	47
C231	82	68	56	47
C234	82	68	56	47
C235	82	68	56	47
C236	82	68	56	47
C237	82	68	56	47

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED, AND MEASURED WITH A 20,000 OHMS-PER-VOLT METER WITH REFERENCE TO A- AND NOT CHASSIS GROUND. AN RF CHOKE (25-50 MICROHENRYS) IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

NOTE: READINGS AT Q204 COLLECTOR AND IN THE POWER CONTROL CIRCUIT WERE TAKEN WITH THE TRANSMITTER ADJUSTED FOR 110 WATTS OUTPUT. THESE READINGS WILL VARY DEPENDING ON THE SETTING OF POWER ADJUST CONTROL R261.

NOTES:
1. CALLED FOR ON PL19C321295
2. 50 Ω MICROSTRIP, W205-W209
3. (A- symbol) INDICATES A-
(ground symbol) INDICATES VEHICLE GROUND

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

▲COMPONENT VALUES

SYMBOL	LL 25-30 MHZ	L 30-36 MHZ	M 36-42 MHZ	H 42-50 MHZ
C238	330	220	180	180
C239	330	220	180	180
C240	330	220	180	180
C241	330	220	180	180
C242	470	470	390	390
C243	470	390	330	330
C244	470	470	390	390
C245	470	390	330	330
C246	470	470	390	390
C247	470	390	330	330
C248	470	470	390	390
C249	470	390	330	330
C250	160	130	110	91
C251	160	130	110	91
C252	160	130	110	91
C253	160	130	110	91
C254	160	130	110	91
C255	160	130	110	91
C256	160	130	110	91
C257	160	130	110	91
C258	390	270	270	180
C259	180	220	120	180
C260	390	270	270	180
C261	180	220	120	180
C262	390	270	270	180
C263	180	220	120	180
C264	390	270	270	180
C265	180	220	120	180
C266	180	180	120	120
C267	180	180	120	120
C268	180	180	120	120
C269	180	180	120	120
C270	1000	1000	680	680
C271	1000	1000	680	680
C272	1000	1000	680	680
C273	1000	1000	680	680
C280	82	68	56	47
C281	82	68	56	47
C282	82	68	56	47
C283	82	68	56	47
C284	240	200	160	140
C285	240	200	160	140
C294	160	130	110	91
C4201	82	68	56	51
C4202	110	91	68	56
C4203	15	13	12	10
C4204	140	110	91	82
C4205	120	100	82	75
C4206	82	68	56	51
R203	12	10	8.2	4.7
R204	12	10	8.2	4.7
R207	680	680	680	910
R208	680	680	680	910
R209	8.2	8.2	8.2	5.6
R210	6.8	3.9	2.0	1.2
R211	6.8	3.9	2.0	1.2
R212	6.8	3.9	2.0	1.2
R213	6.8	3.9	2.0	1.2
R220	6.8	3.9	2.0	1.2
R221	6.8	3.9	2.0	1.2
R222	6.8	3.9	2.0	1.2
R223	6.8	3.9	2.0	1.2
R224	6.8	3.9	2.0	1.2
R225	6.8	3.9	2.0	1.2
R226	6.8	3.9	2.0	1.2
R227	6.8	3.9	2.0	1.2
R228	6.8	3.9	2.0	1.2
R229	6.8	3.9	2.0	1.2
R230	6.8	3.9	2.0	1.2
R231	6.8	3.9	2.0	1.2
R232	6.8	3.9	2.0	1.2
R233	6.8	3.9	2.0	1.2
R234	6.8	3.9	2.0	1.2
R235	6.8	3.9	2.0	1.2

DF-3155

(19R622105, Rev. 3)

SCHEMATIC DIAGRAM

25—50 MHz, 100-WATT POWER AMPLIFIER

PARTS LIST

LBI-4899A

25-50 MHz, 100 WATT
POWER AMPLIFIER
19C321295G5-G8
19C321295G13-G16

SYMBOL	GE PART NO.	DESCRIPTION
		19C321295G5, G13 25-30 MHz (LL) 19C321295G6, G14 30-36 MHz (L) 19C321295G7, G15 36-42 MHz (M) 19C321295G8, G16 42-50 MHz (H)
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L297	19B219997P1	Coil.
L298	19B219997P2	Coil.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q204	19A116965P1	Silicon, NPN.
Q205 thru Q209	19A134104P1	Silicon, NPN.
Q217	19A116742P1	Silicon, NPN.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT201	19A129379G1	Thermistor.
		POWER AMPLIFIER BOARD 19D417927G1 25-30 MHz (LL) 19D417927G2 30-36 MHz (L) 19D417927G3 36-42 MHz (M) 19D417927G4 42-50 MHz (H)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C201 thru C204	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C205LL	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C205L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C205M and C205H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C206LL	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C206L	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C206M	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C206H	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C207LL and C207L	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C207M	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C207H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C208LL	19A116656P330J15	Ceramic disc: 330 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C208L	19A116656P300J15	Ceramic disc: 300 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C208M	19A116656P200J4	Ceramic disc: 200 pf ±5%, 500 VDCW, temp coef -470 PPM.
C208H	19A116656P180J4	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -470 PPM.
C209LL	19A116656P330J15	Ceramic disc: 330 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C209L	19A116656P300J15	Ceramic disc: 300 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C209M	19A116656P200J4	Ceramic disc: 200 pf ±5%, 500 VDCW, temp coef -470 PPM.
C209H	19A116656P180J4	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -470 PPM.
C210LL	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C210L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C210M and C210H	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C211LL and C211L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C211M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C211H	7489162P27C	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C212LL	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C212L	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C212M and C212H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C213LL and C213L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C213M and C213H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C214	19A116966P107	Metallized polyester: 0.1 µf ±10%, 50 VDCW.
C215	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C216 and C217	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C218LL	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C218L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C218M and C218H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C219LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C219L	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C219M	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C219H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C220LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C220L	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C220M	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C220H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C221LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C221L	19A116656P130J	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C221M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C221H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C222LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C222L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C222M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C222H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C223LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C223L and C223M	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C223H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C224LL	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C224L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C224M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C224H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C225LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C225L	7489162P31C	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C225M and C225H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C226LL and C226L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C226M and C226H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C227	19A116966P107	Metallized polyester: 0.1 µf ±10%, 50 VDCW.
C228	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C229	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C230LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C230L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C230M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C230H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C231LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C231L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C231M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C231H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C232 and C233	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C234LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C234L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C234M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C234H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C235LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C235L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C235M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C235H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C236LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C236L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C236M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C236H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C237LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C237L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C237M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C237H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C238LL	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C238L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C238M and C238H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C239LL	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C239L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C239M and C239H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240LL	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C240M and C240H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241LL	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C241M and C241H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C242LL and C242L	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C242M and C242H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C243LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C243L	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C243M and C243H	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C244LL and C244L	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C244M and C244H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C245LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C245L	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C245M and C245H	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C246LL and C246L	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C246M and C246H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C247LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C247L	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C247M and C247H	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C248LL and C248L	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C248M and C248H	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C249LL	7489162P43C	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C249L	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C249M and C249H	7489162P39C	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C250LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C250L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C250M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C250H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C251LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C251L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C251M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C251H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C252LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C252L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C252M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C252H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C253LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C253L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C253M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C253H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C254LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C254L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C254M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C254H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C255LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C255L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C255M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C255H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C256LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C256L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C256M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C256H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C257LL	19A116656P160J3	Ceramic disc: 160 pf ±5%, 500 VDCW, temp coef -330 PPM.
C257L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C257M	19A116656P110J8	Ceramic disc: 110 pf ±5%, 500 VDCW, temp coef -80 PPM.
C257H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C258LL	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C258L and C258M	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C258H and C259LL	19A116679P200J	Mica: 200 pf ±5%, 250 VDCW.
C259L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C259M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C259H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C260LL	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C260L and C260M	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C260H and C261LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C261L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C261M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C261H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C262LL	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C262L and C262M	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C262H and C263LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C263L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C263M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C263H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C264LL	7489162P41C	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C264L and C264M	7489162P37C	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C264H and C265LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C265L	7489162P35C	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C265M	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C265H	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C266LL	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C266L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C266M and C266H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C267LL and C267L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C267M and C267H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C268LL and C268L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C268M and C268H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C269LL and C269L	7489162P33C	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C269M and C269H	7489162P29C	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C270LL and C270L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C270M and C270H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C271LL and C271L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C271M and C271H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C272LL and C272L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C272M and C272H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C273LL and C273L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C273M and C273H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C274 thru C277	19A116966P107	Metallized polyester: 0.1 µf ±10%, 50 VDCW.
C280LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C280L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C280M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C280H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C281LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C281L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C281M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C281H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C282LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C282L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C282M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C282H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C283LL	19A116656P82J0	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef 0 PPM.
C283L	19A116656P68J0	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef 0 PPM.
C283M	19A116656P56J0	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef 0 PPM.
C283H	19A116656P47J0	Ceramic disc: 47 pf ±5%, 500 VDCW, temp coef 0 PPM.
C284LL	19A116679P240J	Mica: 240 pf ±5%, 250 VDCW.
C284L	19A116679P200J	Mica: 200 pf ±5%, 250 VDCW.
C284M	19A116679P160J	Mica: 160 pf ±5%, 250 VDCW.
C284H	19A116679P140J	Mica: 140 pf ±5%, 250 VDCW.
C285LL	19A116679P240J	Mica: 240 pf ±5%, 250 VDCW.
C285L	19A116679P200J	Mica: 200 pf ±5%, 250 VDCW.
C285M	19A116679P160J	Mica: 160 pf ±5%, 250 VDCW.
C285H	19A116679P140J	Mica: 140 pf ±5%, 250 VDCW.
C286 thru C293	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C294LL	19A116679P160J	Mica: 160 pf ±5%, 250 VDCW.
C294L	19A116679P130J	Mica: 130 pf ±5%, 250 VDCW.
C294M	19A116679P110J	Mica: 110 pf ±5%, 250 VDCW.
C294H	19A116679P91J	Mica: 91 pf ±5%, 250 VDCW.
C4201LL*	19A116656P91J1	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -150 PPM.
		In REV A and earlier:
	19A116656P82J1	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4201L	19A116656P68J1	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4201M	19A116656P56J1	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4201H	19A116656P51J1	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4202LL	19A116679P110J	Mica: 110 pf ±5%, 250 VDCW.
C4202L	19A116679P91J	Mica: 91 pf ±5%, 250 VDCW.
C4202M	19A116679P68J	Mica: 68 pf ±5%, 250 VDCW.
C4202H	19A116679P56J	Mica: 56 pf ±5%, 250 VDCW.
C4203LL	19A116656P15J1	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4203L	19A116656P13J1	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4203M	19A116656P12J1	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4203H	19A116656P10J1	Ceramic disc: 10 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4204LL	19A116679P140J	Mica: 140 pf ±5%, 250 VDCW.
C4204L	19A116679P110J	Mica: 110 pf ±5%, 250 VDCW.
C4204M	19A116679P91J	Mica: 91 pf ±5%, 250 VDCW.
C4204H	19A116679P82J	Mica: 82 pf ±5%, 250 VDCW.
C4205LL*	19A116656P91J1	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -150 PPM.
		In REV A and earlier:
	19A116656P82J1	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4205L	19A116679P100J	Mica: 100 pf ±5%, 250 VDCW.
C4205M	19A116679P82J	Mica: 82 pf ±5%, 250 VDCW.
C4205H	19A116679P75J	Mica: 75 pf ±5%, 250 VDCW.
C4206LL	19A116656P82J1	Ceramic disc: 82 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4206L	19A116656P68J1	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4206M	19A116656P56J1	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4206H	19A116656P51J1	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -150 PPM.
C4210 thru C4216	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4220	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4221 and C4222	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4223 thru C4225	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4226 thru C4228	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4229	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.

(Continued on Page 17)

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

(Continued from Page 16)

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR201*	19A116052P2	Silicon.
		Earlier than REV A:
	19A115250P1	Silicon.
CR202 thru CR204	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J201 thru J203	19A116832P1	Receptacle, coaxial: sim to Cinch 14H11613.
J205	19B219374G1	Connector: 9 contacts.
J206 and J207		(Part of K201).
J208	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K201	19A116722P1	Hermetic sealed: 125 ohms ±20%, 1 form C contact, 9.6 to 15.8 VDC (over the temp range indicated.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L201LL	19C320617P1	Coil.
L201L	19C320617P23	Coil.
L201M	19C320617P24	Coil.
L201H	19C320617P2	Coil.
L202LL	19C320617P3	Coil.
L202L	19C320617P5	Coil.
L202M	19C320617P25	Coil.
L202H	19C320617P4	Coil.
L203	7488079P42	Choke, RF: 8.20 µh ±10%, 0.25 ohms DC res max; sim to Jeffers 4422-3.
L204LL	19C320617P5	Coil.
L204L	19C320617P26	Coil.
L204M	19C320617P27	Coil.
L204H	19C320617P6	Coil.
L205LL	19C320617P2	Coil.
L205L and L205M	19C320617P6	Coil.
L205H	19C320618P1	Coil.
L206LL	19C320617P7	Coil.
L206L	19C320617P28	Coil.
L206M	19C320617P29	Coil.
L206H	19C320617P8	Coil.
L207LL	19C320617P9	Coil.
L207L	19C320617P30	Coil.
L207M	1C320617P31	Coil.
L207H	19C320617P10	Coil.
L208LL	19C320619P1	Coil.
L208L	19C320618P7	Coil.
L208M	19C320619P5	Coil.
L208H	19C320619P6	Coil.
L209	7488079P42	Choke, RF: 8.20 µh ±10%, 0.25 ohms DC res max; sim to Jeffers 4422-3.
L210LL	19C320617P11	Coil.
L210L and L210M	19C320617P4	Coil.
L210H	19C320617P12	Coil.
L211LL	19C320618P6	Coil.
L211L and L211M	19C32068P6	Coil.
L211H	19C320618P1	Coil.
L214LL	19C320617P13	Coil.
L214L	19C320617P32	Coil.
L214M	19C320617P18	Coil.
L214H	19C320617P14	Coil.
L215LL	19C320617P13	Coil.
L215L	19C320617P33	Coil.
L215M	19C320617P34	Coil.
L215H	19C320617P18	Coil.
L216LL	19C320617P13	Coil.
L216L	19C320617P33	Coil.
L216M	19C320617P34	Coil.
L216H	19C320617P18	Coil.
L217LL	19C320617P15	Coil.
L217L	19C320617P5	Coil.
L217M	19C320617P26	Coil.
L217H	19C320617P6	Coil.
L218LL	19C320617P15	Coil.
L218L	19C320617P5	Coil.
L218M	19C320617P26	Coil.
L218H	19C320617P6	Coil.
L219LL	19C320617P15	Coil.
L219L	19C320617P5	Coil.
L219M	19C320617P26	Coil.
L219H	19C320617P6	Coil.
L220LL	19C320617P15	Coil.
L220L	19C320617P5	Coil.
L220M	19C320617P26	Coil.
L220H	19C320617P6	Coil.
L221LL	19C320619P1	Coil.
L221L	19C320618P5	Coil.
L221M	19C320619P5	Coil.
L221H	19C320619P6	Coil.
L222LL	19C320619P1	Coil.
L222L	19C320618P7	Coil.
L222M	19C320619P5	Coil.
L222H	19C320619P6	Coil.
L223LL	19C320619P1	Coil.
L222L	19C320618P7	Coil.
L222M	19C320619P5	Coil.
L223H	19C320619P6	Coil.
L224LL	19C320619P1	Coil.
L224L	19C320618P7	Coil.
L224M	19C320619P5	Coil.
L224H	19C320619P6	Coil.
L225 thru L228	7488079P42	Choke, RF: 8.20 µh ±10%, 0.25 ohms DC res max; sim to Jeffers 4422-3.
L229LL	19C320617P16	Coil.
L229L	19C320617P35	Coil.
L229M	19C320617P12	Coil.
L229H	19C320617P17	Coil.
L230LL	19C320617P16	Coil.
L230L	19C320617P35	Coil.
L230M	19C320617P12	Coil.
L230H	19C320617P17	Coil.
L231LL	19C320617P16	Coil.
L231L	19C320617P35	Coil.
L231M	19C320617P12	Coil.
L231H	19C320617P17	Coil.
L232LL	19C320617P16	Coil.
L232L	19C320617P35	Coil.
L232M	19C320617P12	Coil.
L232H	19C320617P17	Coil.
L233LL	19C320618P2	Coil.
L233L and L233M	19C320618P6	Coil.
L233H	19C320618P1	Coil.
L234LL	19C320618P2	Coil.
L235L and L235M	19C320618P6	Coil.
L235H	19C320618P1	Coil.
L236LL	19C320618P2	Coil.
L236L and L236M	19C320618P6	Coil.
L236H	19C320618P1	Coil.
L237LL	19C320617P37	Coil.
L237L	19C320617P38	Coil.
L237M	19C320617P39	Coil.
L237H	19C320617P40	Coil.
L238LL	19C320617P37	Coil.
L238L	19C320617P38	Coil.
L238M	19C320617P39	Coil.
L238H	19C320617P40	Coil.
L239LL	19C320617P37	Coil.
L239L	19C320617P38	Coil.
L239M	19C320617P39	Coil.
L239H	19C320617P40	Coil.
L240LL	19C320617P37	Coil.
L240L	19C320617P38	Coil.
L240M	19C320617P39	Coil.
L240H	19C320617P40	Coil.
L241LL	19C320617P41	Coil.
L241L	19C320617P42	Coil.
L241M	19C320617P43	Coil.
L241H	19C320617P44	Coil.
L242LL	19C320617P41	Coil.
L242L	19C320617P42	Coil.
L242M	19C320617P43	Coil.
L242H	19C320617P44	Coil.
L243LL	19C320617P41	Coil.
L243L	19C320617P42	Coil.
L243M	19C320617P43	Coil.
L243H	19C320617P44	Coil.
L244LL	19C320617P41	Coil.
L244L	19C320617P42	Coil.
L244M	19C320617P43	Coil.
L244H	19C320617P14	Coil.
L245LL	19A129360P9	Coil.
L245L	19A129360P6	Coil.
L245M	19A129360P4	Coil.
L245H	19A129360P1	Coil.
L246LL	19A129360P10	Coil.
L246L	19A129360P7	Coil.
L246M	19A129360P3	Coil.
L246H	19A129360P2	Coil.
L247LL	19A129360P11	Coil.
L247L	19A129360P8	Coil.
L247M	19A129360P5	Coil.
L247H	19A129360P3	Coil.
L248LL	19A129360P9	Coil.
L248L	19A129360P6	Coil.
L248M	19A129360P4	Coil.
L248H	19A129360P1	Coil.
L249LL	19C320617P41	Coil.
L249L	19C320617P42	Coil.
L249M	19C320617P43	Coil.
L249H	19C320617P44	Coil.
L250LL	19C320617P41	Coil.
L250L	19C320617P42	Coil.
L250M	19C320617P43	Coil.
L250H	19C320617P44	Coil.
L251 thru L254	7488079P9	Choke, RF: 2.70 µh ±10%, 1.20 ohms DC res max; sim to Jeffers 4411-13.
L255	7488079P12	Choke, RF: 4.70 µh ±10%, 0.22 ohms DC res max; sim to Jeffers 4421-3.
L256 and L257	7488079P9	Choke, RF: 2.70 µh ±10%, 1.20 ohms DC res max; sim to Jeffers 4411-13.
L258	7488079P10	Choke, RF: 3.30 µh ±10%, 0.15 ohms DC res max; sim to Jeffers 4421-1K.
L259 thru L263	19A129346G1	Coil.
		- - - - - - - - - - - TRANSISTORS - - - - - - - -
Q211	19A115910P1	Silicon, NPN; sim to Type 2N3906.
Q212 thru Q214	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q215	19A115910P1	Silicon, NPN; sim to Type 2N3906.
Q216	19A115779P1	Silicon, PNP; sim to Type 2N3251.
		- - - - - - - - - - - RESISTORS - - - - - - - - -
R201	3R152P392J	Composition: 3900 ohms ±5%, 1/4 w.
R202	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R203LL	3R77P120J	Composition: 12 ohms ±5%, 1/2 w.
R203L	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R203M	7147161P42	Composition: 8.2 ohms ±5%, 1/2 w.
R203H	7147161P13	Composition: 4.7 ohms ±5%, 1/2 w.
R204LL	3R77P120J	Composition: 12 ohms ±5%, 1/2 w.
R204L	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R204M	7147161P42	Composition: 8.2 ohms ±5%, 1/2 w.
R204H	7147161P13	Composition: 4.7 ohms ±5%, 1/2 w.
R205 and R206	3R77P390J	Composition: 39 ohms ±5%, 1/2 w.
R207LL	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R207L	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R207M	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R207H	3R78P911J	Composition: 910 ohms ±5%, 1 w.
R208LL	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R208L	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R208M	3R78P681J	Composition: 680 ohms ±5%, 1 w.
R208H	3R78P911J	Composition: 910 ohms ±5%, 1 w.
R209LL	5490205P14	Composition: 8.2 ohms ±5%, 1 w.
R209L	5490205P14	Composition: 8.2 ohms ±5%, 1 w.
R209M	5490205P14	Composition: 8.2 ohms ±5%, 1 w.
R209H	5490205P6	Composition: 5.6 ohms ±5%, 1 w.
R210LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R210L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R210M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R210H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R211LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R211L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R211M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R211H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R212LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R212L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R212M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R212H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R213LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R213L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R213M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R213H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R214 and R215	3R77P390J	Composition: 39 ohms ±5%, 1/2 w.
R216 thru R218	3R78P101J	Composition: 100 ohms ±5%, 1 w.
R220LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R220L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R220M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R220H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R221LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R221L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R221M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R221H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R222LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R222L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R222M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R222H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R223LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R223L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R223M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R223H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R224LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R224L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R224M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R224H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R225LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R225L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R225M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R225H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R226LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R226L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R226M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R226H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R227LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R227L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R227M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R227H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R228LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R228L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R228M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R228H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R229LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R229L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R229M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R229H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R230LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R230L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R230M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R230H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R231LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R231L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R231M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R231H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R232LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R232L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R232M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R232H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R233LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R233L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R233M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R233H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R234LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R234L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R234M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R234H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R235LL	7147161P39	Composition: 6.8 ohms ±5%, 1/2 w.
R235L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R235M	7147161P27	Composition: 2.0 ohms ±5%, 1/2 w.
R235H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R236 thru R243	3R77P390J	Composition: 39 ohms ±5%, 1/2 w.
R244 thru R246	3R79P101J	Composition: 100 ohms ±5%, 2 w.
R249	19C320212P2	Shunt resistor.
R250 and R251	19C320212P1	Shunt resistor.
R252	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R253	3R152P682J	Composition: 6800 ohms ±5%, 1/4 w.
R254	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
R255	19A116278P253	Metal film: 3480 ohms ±2%, 1/2 w.
R256	19A116278P201	Metal film: 1000 ohms ±2%, 1/2 w.
R257	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.
R258	19A116278P269	Metal film: 5110 ohms ±2%, 1/2 w.
R259	19A116278P261	Metal film: 4220 ohms ±2%, 1/2 w.
R261	19A116559P102	Variable, cermet: 5000 ohms ±20%, .5 w; sim to CTS Series 360.
R262	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
R263	3R152P682J	Composition: 6800 ohms ±5%, 1/4 w.
R264	3R77P121J	Composition: 120 ohms ±5%, 1/2 w.
R265	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R266	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R267	3R152P182J	Composition: 1800 ohms ±5%, 1/4 w.
R268	3R152P100J	Composition: 10 ohms ±5%, 1/4 w.
R269	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R270	3R152P241J	Composition: 240 ohms ±5%, 1/4 w.
R271	3R152P332J	Composition: 3300 ohms ±5%, 1/4 w.
R272	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R273 thru R277	3R78P100K	Composition: 10 ohms ±10%, 1 w.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - -
VR201	4036887P1	Silicon, Zener.
VR202	4036887P5	Silicon, Zener.
		- - - - - - - - - - - - CABLES - - - - - - - - -
W201	19A129571P1	Strap.
W202	19B219998P2	Jumper.
W203	19B219998P1	Jumper.
W204	19C320624P1	Strip, connector.
W205 thru W209		(Part of printed wiring board 19D417923).
		HEAT SINK ASSEMBLY 19B219688G6 M MODEL AND INTERMITTANT DUTY STATION 19B219688G18 E MODEL
		- - - - - - - - - - - CAPACITORS - - - - - - - - -
C297 and C298	19A116708P1	Ceramic, feed-thru: 0.01 µf +100% -0%, 500 VDCW; sim to Erie Style 327.
C299	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR295	19A116783P1	Silicon.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A129361P1	Shield. (Located between L246 and L247, L247 and L248).
	19A129361P2	Shield. (Located between L245 and L246).
	19A129810P1	Spacer, phenolic: .047 1D. (Used with L201, L205-L207, L211, L233-L244, L249, L250).
	19A129810P2	Spacer, phenolic: .059 1D. (Used with L201, L202, L204, L207, L208, L210, L214-L224, L229-L232, L237-L244, L249, L250).
	19B219391P1	Filter casting.
	19A116022P1	Insulator, bushing. (Used with Q217).
	19A116023P1	Insulator, plate. (Used with Q217).
	N5602P015	"O" Ring. (Used with Q217).
	N402P7C6	Washer: No. 6. (Used with Q217).
	19A129888P1	Insulator. (Used with Q217).
	19D416712P2	Insulator. (Located under Power Amplifier Board).
	19A129661P1	Insulator. (Located at L298).
	19B201074P320	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1-1/4. (Secures Filter Casting).
	5492178P2	Washer, spring tension: sim to Wallace Barnes 375-20. (Used with Q204-Q209).
	N207P15C6	Hexnut: No. 8-32. (Used with Q204-Q209).
	19A129434P1	Washer. (Used with C297, C298).

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - Power Amplifier Board 19D417927G1-4

To improve operation. Changed CR201.

REV. B - To improve stopband attenuation (25-30 MHz range) Changed C4201LL and C4205LL.

END OF DOCUMENT